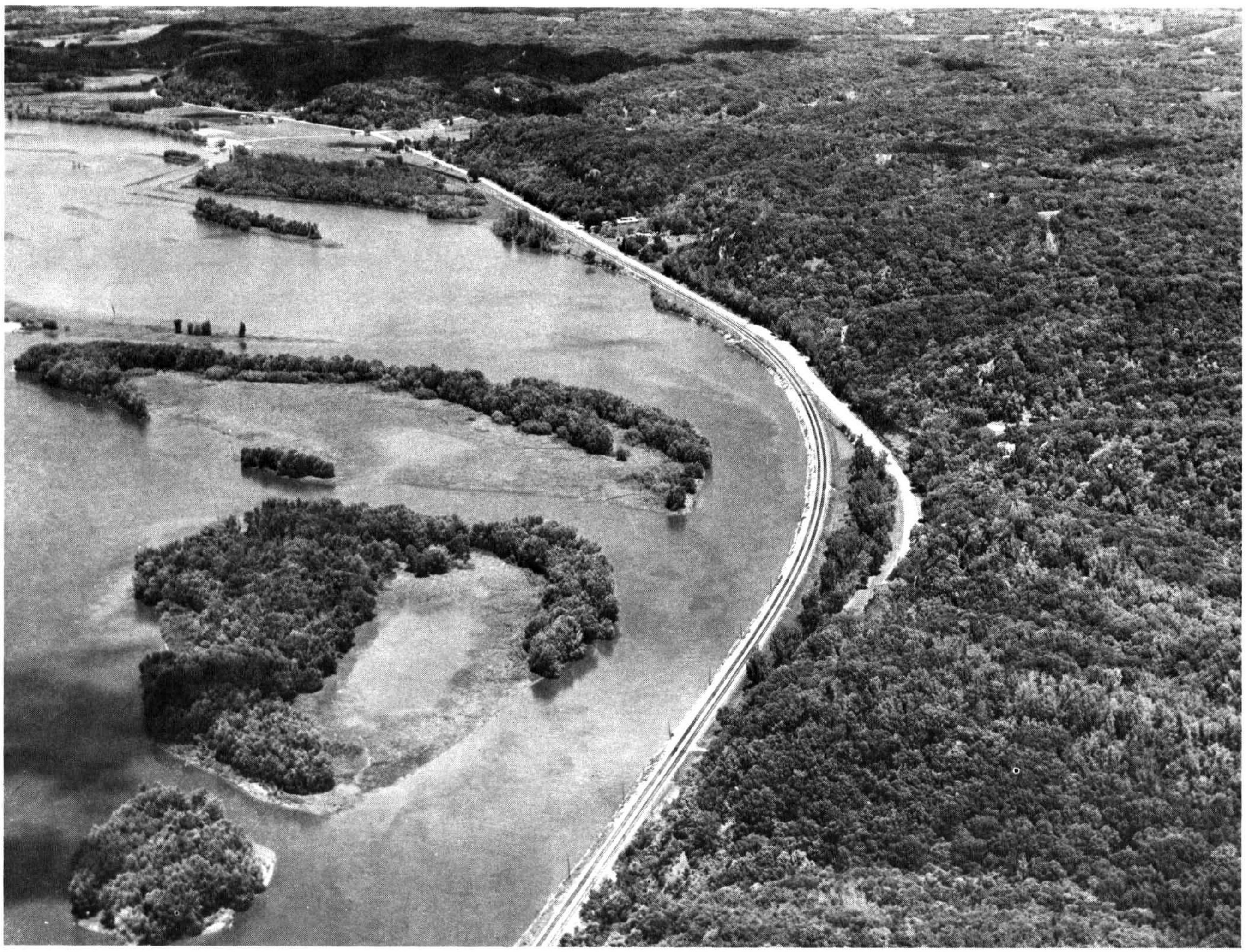
Soil Survey: Carroll County, Illinois



Cover: Mississippi Palisades State Park area north of Savanna. The islands are of Mixed Alluvial Land; the highway and railroad are on alluvial and bluff-wash sediments. Sogn soils and limestone escarpments occur on much of the upland bluff face, and forested areas of mainly Seaton with some Timula soils occur away from the bluff. This area is shown on Map Sheets 9 and 10. (Photo courtesy of State of Illinois Department of Conservation.)

SOIL SURVEY:

SOIL REPORT 98

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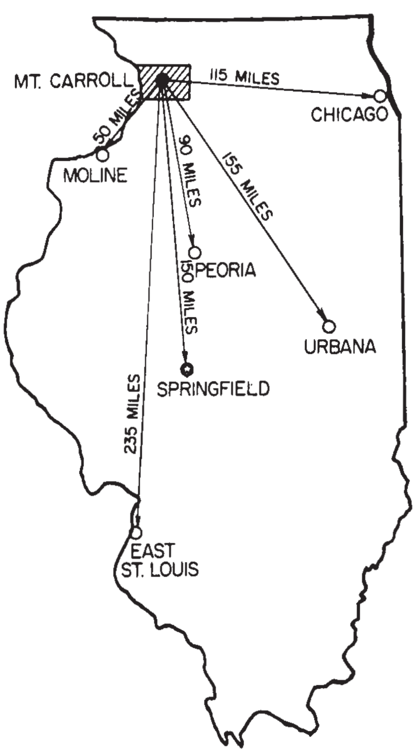
Carroll County, Illinois



University of Illinois Agricultural Experiment Station in cooperation with Soil Conservation Service, U.S. Department of Agriculture.

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NOVEMBER, 1975 URBANA, ILLINOIS

CONTENTS

THIS SOIL SURVEY REPORT, which includes a detailed soil map and a general soil map, can be helpful to all persons who desire information about the soils of Carroll County. This includes farmers, foresters, engineers and builders, community planners, persons interested in wildlife and recreation, and many others.

A few persons will be interested in all sections of this report, but many users will be able to obtain the information they desire by reading the sections which are pertinent to their particular interests.

A previous publication, "Carroll County, Illinois, Soil Management Guide," (*18*)[1] provided soil information and management suggestions for a variety of users, but it was designed primarily to give information to individual farmers for specific tracts of land shortly after the original soil survey information became available.

The Management Guide material was prepared before the final maps were drafted and before the correlation of Carroll County soils was complete. Combination and elimination of some mapping units, some soil series name and number changes, revisions of crop yield estimates, and other revisions have been made in the preparation of this soil survey report.

HOW TO USE THE SOIL MAP AND REPORT

The location and extent of the general soil areas of Carroll County, shown on the general soil map on page 137, and the discussion of the general soil areas, pages 9 to 16, provide information which may be helpful to those who are interested in a broad view of the soil resources of the county. Many users, however, will be interested in specific tracts of land and the more detailed soil information provided on the map sheets at the back of the report.

Examine the soil map. The detailed soil map of Carroll County has 39 sheets. Most sheets cover 12 sections except those on the western county boundary, which are irregular in shape and variable in coverage. An index to the numbered map sheets, showing the area covered by each sheet, accompanies the soil map.

The aerial photo background of the map sheets shows a pattern of light and dark shades. In areas where most of the soil is cultivated, these color contrasts represent field boundaries and cropping patterns and sometimes surface soil color differences. In the more hilly parts of the county the dark portions of the map are often forested areas and the light-colored portions are the cleared and cultivated areas. Soil boundaries, soil symbols, streams, and features such as roads, railroads, houses, dams, and levees are in black.

The soil symbols designate mapping units that are based on three things: soil, average slope of the area, and estimated erosion conditions.

For symbols consisting of three parts (as in 36C2), the first number indicates the soil name, the capital letter indicates the slope range, and the third part of the symbol is a number indicating degree of erosion; 36C2, for example, is translated as Tama silt loam, 4 to 7 percent slopes, moderately eroded. Two-part symbols (as in 36B) have no erosion symbol and indicate erosion is in the none-to-slight range. One-part symbols (such as 68) have no slope or erosion designation, indicating the soil area has a slope range of 0 to 2 percent and erosion is none to slight.

[1] Italicized numerals refer to entries in Literature Cited.

The slope symbols or capital letters have the following definitions:

Slope symbol	*Slope description*	*Slope range (%)*
A	Nearly level	0-2
B	Gently sloping	2-4
C	Moderately sloping	4-7
D	Strongly sloping	7-12
E	Very strongly sloping	12-18
F	Steep	18-30
G	Very steep	30-60

The erosion symbols or numbers have the following definitions:

Erosion symbol	*Erosion description*
None	No erosion to slight erosion
2	Moderate erosion
3	Severe erosion
4	Gullied

The erosion terms or descriptions are further defined as follows:

No or slight erosion — more than 7 inches of original surface soil remaining.

Moderate erosion — 3 to 7 inches of surface soil remaining.

Severe erosion — less than 3 inches of surface soil remaining, or a plow layer consists largely of subsoil material.

Gullied — area is eroded in a pattern of deep gullies not crossable with implements.

Other symbols are used to indicate special soil conditions in a few mapping units. A line over the soil number (as in $\overline{107}$) indicates the area is subject to frequent ponding or a high water table and needs artificial drainage before it can have general use as cropland. Use of a + symbol (as in 68+) indicates 7 to 20 inches of recently deposited sediments, usually of different texture or color, or both, from the original surface soil, over an identifiable soil profile.

There are three cases in which *either* numbers *or* capital letters are used to indicate the soils of a mapping unit. These are **951** or Y, **952** or Z, and **972** or X. In all other cases soils are indicated on the map by numbers only.

The mapping units, arranged numerically by soil numbers, are listed in the legend preceding the soil map and in the Guide to Mapping Units on page 131.

To help find a particular farm or tract of land, many cultural features such as roads, railroads, towns, and farmhouses are shown on the soil map. Section boundaries, section numbers, township and range numbers, and physical features such as streams and ponds are also shown. If the legal description is known, a tract of land can be easily located by using township, range, and section numbers.

Study the characteristics of the soils. After locating a tract of land and identifying the mapping units on it, turn to the Guide to Mapping Units on page 131 to find where the different soils are described and where management and other features are discussed.

In studying the soil descriptions, note that soils are separated on the basis of many characteristics to a depth of 4 to 5 feet, not on their surface character alone. Often the surface or A horizon of one soil is little or no different from that of another, yet the differences in the subsoil or B horizon or the C horizon of these two soils may be great, thus resulting in a difference in agricultural value. The nature of the B and C horizons is important in determining the drainability and moisture-supplying power of most soils, especially during critical periods of excess rainfall or drouths.

Most upland and terrace soils have three major horizons — A, B, and C. Sometimes an R horizon (solid bedrock) is encountered. The horizons used in this report are defined briefly in Figure 1 and in the Glossary on page 128. Other symbols such as Ap, t, g, b, II, and III are defined as follows. The Ap is the surface plow layer in a cultivated soil; t indicates that the particular horizon shows evidence that silicate clays have been moved in from horizons above; g indicates there is evidence of strong gleying or waterlogging in the designated horizon; b indicates a buried horizon that was once at the surface. The II and III indicate that these materials are of different origin from the overlying soil material.

In studying characteristics of the various soils, it is important to understand that each soil series has a range in properties and that the boundaries between soils on the landscape are not necessarily sharp.

HOW SOILS ARE CLASSIFIED, NAMED, AND MAPPED

Soil scientists made this survey to learn what kinds of soils are in Carroll County, where they are located, and how they can be used.

They went into the county knowing they would likely find many soils they had already seen, and perhaps some they had not. As they worked throughout the county, they observed steepness, length, and shape of slopes; size of streams; kinds of native plants or crops; kinds of rock; and many facts about the soils. They dug or bored many holes to expose soil profiles. They also observed natural and manmade cuts that exposed profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down to material that has not been changed much by leaching or by roots of plants.

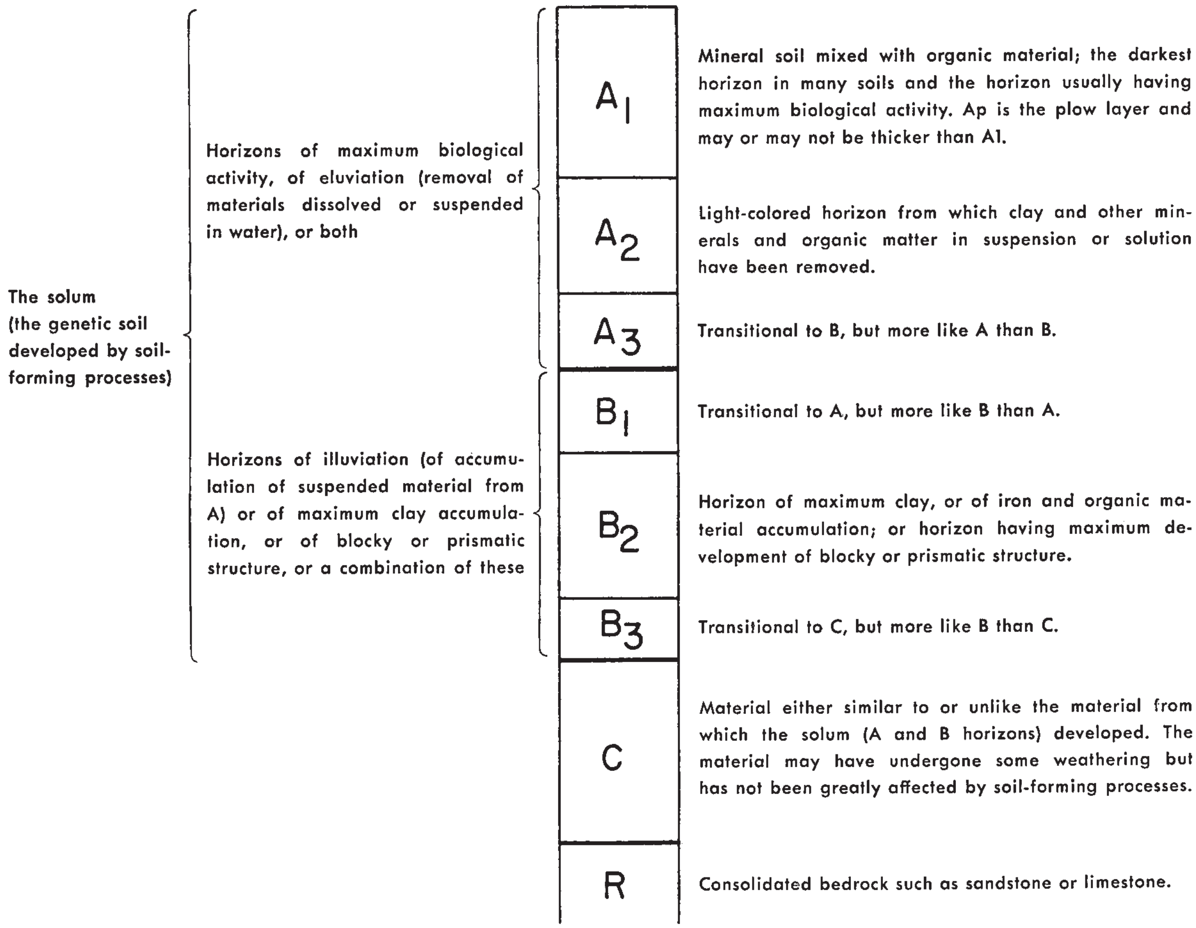
The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide uniform procedures. The soil series and soil phase are the categories of soil classification most used in a local survey (*22*).

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Tama and Mt. Carroll are examples of soil series names in Carroll County. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, *Fayette silt loam, 4 to 7 percent slopes, moderately eroded,* is one of the several phases within the Fayette series.

After a guide for classifying and naming the soils had been worked out, the soil scientists working in the field drew boundaries of the individual soils on aerial photographs. These photographs show such features as woodlands, buildings, field borders, trees, and other details that help in drawing soil boundaries accurately. The detailed soil maps in the back of this publication were prepared from aerial photographs.

The areas shown on the soil maps are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of one recognized soil phase.



Principal horizons of upland soils. Not every horizon and subhorizon shown here, however, is necessarily present in all soils. (Adapted from *Nomenclature of Soil Horizons*, U.S. Dept. Agr. Handbook 18, pp. 174-183. 1951.) (Fig. 1)

In some parts of a survey area different kinds of soils may occupy small areas in such an intricate pattern that it is not practical to show them separately on the map. This kind of soil pattern is shown as one mapping unit and is called a soil complex. Tell-Lamont complex, 4 to 7 percent slopes, moderately eroded, is an example.

Areas may also be encountered where the soil pattern, though not extremely complicated or intricate, does lack regularity so that soil separations cannot be made with a reasonable degree of accuracy. These areas are composed of two or more series, and in some cases one mapping unit may contain only one of the soils. These are called undifferentiated units and several of these are mapped in Carroll County. One example is Eleroy and Derinda silt loams, 7 to 12 percent slopes, moderately eroded.

In Carroll County there are areas where the soil material is so variable or so severely eroded that it cannot be classified by soil series. These areas are shown on the map and are described, but they are called land types and are given descriptive names. Blown-Out Land is an example of a land type in Carroll County.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soils in other places are compared. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soils. Yields under defined management are estimated for all the soils (Table 4).

Only part of a soil survey is finished when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in such a way as to be readily useful to different groups of users — farmers, managers of woodland, engineers, and other land-use planners.

On the basis of yield and practice tables and other data, the soil scientists set up trial groups. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others; then they adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

NATURAL FEATURES OF CARROLL COUNTY

Location and Size

Carroll County is located in northwestern Illinois. It is bounded on the west by the Mississippi River, on the north by JoDaviess and Stephenson Counties, on the east by Ogle County, and on the south by Whiteside County.

Mt. Carroll, the county seat, is located slightly northwest of the center of the county; it is approximately 115 miles northwest of Chicago, 50 miles from the Rock Island-Moline area, and 155 miles from the Champaign-Urbana area.

Carroll County has a total area of 477 square miles or 305,280 acres. It extends a little over 18 miles north to south and averages about 24 miles from east to west; the irregular west boundary is formed by the Mississippi River, which has a general north to south direction in the southern two-thirds of the boundary but a southeast to northwest trend in the northern one-third. The center of the Mississippi River marks the boundary with Iowa.

Physiography and Drainage

Most of Carroll County is in the Rock River Hill Country of the Till Plains Section of the Central Lowland Province. The northwestern one-fourth of the county, generally north of the village of Wacker and west of Illinois State Route 78, is included in the Wisconsin Driftless Section of the Central Lowland Province (*12*).

The Wisconsin Driftless Section, which was unglaciated, is maturely to submaturely dissected by numerous dentritic drainage systems tributary to the Mississippi River. The Mississippi Valley has precipitous walls breaking into broad terraces and bottomlands. Thick loess mantles the bluffs, except on bluff faces, and thins in an easterly direction.

The glaciated portion of the county, part of the Rock River Hill Country, has more subdued rolling hill lands in the stage of late youth to early maturity. The Illinoian drift is thin in the area, and the uplands and valleys are determined primarily by the bedrock surface. In the southwestern part of the county, in the uplands, deposits of loess and fine sand occur on ridges and as low dunes on the eroded Illinoian till plain.

The highest point in the county is about two miles southeast of Shannon and has an elevation of approximately 1,070 feet. Some lowlands and islands in the Mississippi Valley are below 590 feet. The normal pool level of the Mississippi River near the southwest corner of Carroll County is 583 feet.

The county is drained by several major streams. Apple River, Rush Creek, Johnson Creek, and Plum River, which is joined in the area between Mt. Carroll and Savanna by Camp and Carroll Creeks, drain directly into the Mississippi River.

In the southeastern part of the county, Elkhorn Creek, with Eagle and Middle Creeks as tributaries, and Rock Creek, with its Otter Creek tributary, drain southwestward into Whiteside County and the Rock River.

The very northeastern part of the county is drained by Lost Creek, which flows north through Stephenson County into Yellow Creek and eventually the Pecatonica River. This water eventually reaches the Mississippi River but in a circuitous route by way of the Pecatonica and Rock Rivers.

Geology

The bedrock which immediately underlies the glacial deposits and which occasionally outcrops in Carroll County is identified as belonging to the Silurian or to the Ordovician System (*7, 26*). The younger Silurian rocks are almost entirely dolomite and occur mainly across the northern one-third of the county and in the central portion of the southern one-third. The remainder of the county, and the larger portion, is underlain by the older Ordovician rocks. The Ordovician rocks are also primarily dolomite, but some shale is present along with some minor areas of sandstone bedrock. Some of the dolomite of both ages contains significant chert bands.

A significant rock structural feature, the Savanna Anticline, occurs in an east-west direction across the county with its axis running through Mt. Carroll and Savanna and is related to the domination of Ordovician rocks across the central portion of the county and restriction of the Silurian rocks to the northern and south-central portions.

Sinkhole on ridgetop area in Mississippi Palisades State Park. The area is loess covered, but carbonates in the underlying limestone have been dissolved and removed, producing the small, deep, closed depression on the landscape. (Fig. 2)

In places, as indicated in soil series descriptions and by their distribution on the soil map sheets, the bedrock is part of some soil profiles and has significant effects on their properties.

Except for upland areas in the extreme northwestern part of the county, mainly the upland portions of Woodland, Washington, and Savanna Townships, Carroll County was glaciated. This is currently believed to have been the result of the Illinoian glaciation which advanced from the east and deposited glacial till and some stratified, water-deposited materials over the bedrock of the area (*5, 27*). The drift thickness seldom exceeds 50 feet and in most places, except in valley fills, is much less. Where the glaciated area borders the driftless area, the drift may be only a few inches thick (*15*). The age of the glacial till in northwestern Illinois has been a subject of considerable controversy. If the assignment of the till deposits to the Illinoian Glacial Stage is valid, the glaciation of the area probably occurred 100,000 or more years ago.

The ice of the younger Wisconsinan Glacial Stage did not reach Carroll County but did cover portions of the adjoining counties to the east and south. When ice of the Woodfordian Substage of the Wisconsinan Stage blocked the Ancient Mississippi Valley south of Carroll County, Lake Cordova was formed and persisted until the Mississippi was diverted into its present channel. Lake Cordova existed in the Mississippi Valley in Carroll County, and the fine-textured lacustrine sediments that occur up the tributary valleys, such as along Plum River, and the sandy deposits that occur in the main valley are Wisconsinan-age deposits.

Quarry in dolomitic limestone in the bluff area bordering the Mississippi River Valley. Narrow bands of white chert are visible. (Fig. 3)

It is believed that when glacial ice of the Wisconsinan Stage lay to the south and east of Carroll County climatic conditions were responsible for intense water and wind erosion in the area. The Illinoian drift in Carroll County shows evidence of severe erosion and truncation. Where this drift is the surface material and the parent material for the soils, considerable variation occurs in depth of leaching, thickness of sola, and weathering. Because of this, soils that are considered old and youthful occur together in the same landscape, and an understanding of geologic events is important in understanding the characteristics and distribution of the present-day soils on the land surface.

When the ice of the Wisconsinan Stage melted, tremendous amounts of sediment filled the Mississippi River Valley. During dry seasons and following the retreat of the Wisconsinan glaciers, the fine sediments, largely of silt size, were blown from the valley and deposited by wind on the uplands; in most places they buried the soils that had developed in the older Illinoian drift. Roxana silts and, to a lesser extent, Robein silts occur in places in the lower part of this extensive silt blanket, but the major portion is classified as Peoria Loess, which is the uppermost and most recent deposit. The Peoria Loess was deposited during and following the Woodfordian Substage of the Wisconsinan Stage. On stable landscape positions (ridgetops, which are little affected by erosion), the loess thickness, in places, exceeds 30 feet in the uplands near the Mississippi River and thins in an easterly direction to depths of about 10 feet or less in the east-central and northeastern part of the county. Because of these thick loess deposits, most of the upland soils are developed in this material. On more sloping upland areas throughout the county, however, glacial till or bedrock, or both, may be parent materials for soils because of the thinness or absence of the loess cover.

Since glacial times, sediment has accumulated in the valleys and flood plains of the major streams; in some places, especially at the base of the bluffs bordering the Mississippi Valley, colluvium or bluff wash has accumulated to add to the variety of materials from which Carroll County soils have developed.

Readers interested in the glacial history and nature of glacial deposits of Carroll County should consult Bulletin 94 of the Illinois State Geological Survey (*27*) and the other references indicated in this section.

Mineral Resources

The most important mineral resource of the county is the dolomitic limestone bedrock, which is quarried, crushed, and used for agricultural limestone, road surfacing, and construction. In 1971 Carroll County ranked 35th among the 67 stone-producing counties in Illinois. Common sand and gravel are produced from a number of small pits, and the county ranked 56th and 54th, respectively, in these two commodities among the state's counties in 1971 (*2*).

Shortly after the county was established, small amounts of lead and zinc minerals were quarried from veins in the bedrock in Carroll County, but amounts were much smaller than the deposits worked in Jo Daviess County to the north and in counties in southwestern Wisconsin. For a short period and as recently as 1960, small amounts of molding sand were produced from an upland deposit east of Savanna.

Water Resources

The Mississippi River is an important water resource for Carroll County, but its principal use is for transportation and recreation rather than for consumption. Domestic, municipal, and industrial water supplies are dependent on wells which penetrate to the underground reservoirs.

Glacial deposits in the uplands are generally too thin and not coarse-textured enough to serve as good aquifers. Permeable sand and gravel deposits in the Mississippi River Valley and in the Johnson Creek Valley south and west of Mt. Carroll, however, are thick enough to serve as good aquifers. In the uplands, drilled wells, reaching to the water-bearing crevasses of the Silurian, Ordovician, or Cambrian bedrock formations are the principal suppliers of ground water.

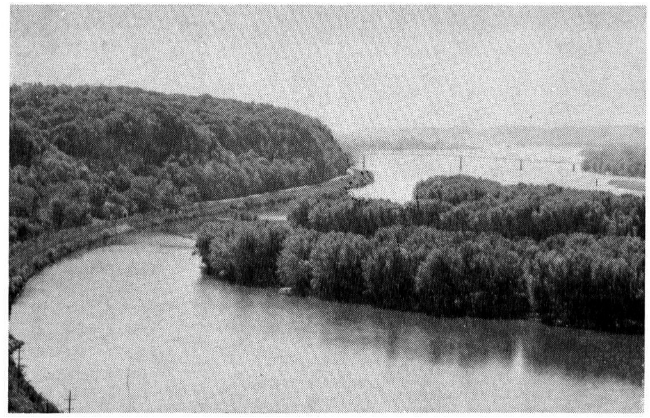
Good domestic water supplies can be obtained from the bedrock at depths generally less than 250 feet (*6*). Most municipal water supplies come from deeper wells, usually less than 2,000 feet but deep enough to tap the sandstone aquifers in the Ordovician or underlying Cambrian bedrock (*24*).

Water for livestock is supplied in many areas by flowing streams and good yielding springs. A few farm ponds for livestock water supply have been constructed.

Climate[1]

Carroll County has the continental climate typical of northern Illinois. There is a wide annual temperature range, an average of more than 110 degrees, from summer maximums in the mid to upper 90's to winter lows of about −15° F. Low pressure areas and the associated weather fronts bring frequent changes in temperature, humidity, cloudiness, and wind direction during much of the year.

Annual precipitation averages about 35 inches but has varied from just less than 18 to more than 51 inches. The annual precipitation is less than 28 inches about one year in six and more than 43 inches equally as often. Monthly precipitation averages less than 2 inches for the winter months of December through February and more than 4 inches for the May through June period. On the average, more than 50 percent of the normal precipitation occurs during the growing season of May through September.



Mississippi River, islands, and upland bluff in Mississippi Palisades State Park area. Bridge to Sabula, Iowa, is in background. (Fig. 4)

Normal July and August rainfall alone is insufficient to meet the moisture demand of a vigorously growing field crop. Subsoil moisture must be stored from the previous fall through spring for best crop production during most seasons. Major drouths are infrequent. Rather prolonged dry periods during a portion of the growing season are not unusual. Such periods often result in a reduction from potential crop yields.

Summer precipitation occurs mostly as showers or thunderstorms of brief duration. A single thunderstorm often produces in excess of an inch of rain and occasionally is accompanied by hail and damaging winds. As much as 5 inches of rain has fallen in a 24-hour period and more than 12 inches in a single month. There was no measurable rain during October, 1952. Annual snowfall averages about 35 inches. More than 70 inches fell during the winter of 1925-26 and more than 30 inches during January, 1918.

Growing field crops are most likely to be damaged if hail falls during the months of June, July, and August. Thunderstorm days average almost 50 annually with about half of these during the critical growing period. Hail-producing thunderstorms in the same locality average about three annually and about one during the summer months. Not all hailstorms have stones of sufficient size or quantity to produce extensive crop damage (*8*).

Summers are warm, but hot periods are seldom prolonged. Cool air invasions from the north occur frequently enough, even in summer, to prevent stagnation of hot, humid air masses. July is normally the warmest month. The record high temperature of 108° F. occurred on July 12, 1936. All months from May through August have had temperatures in excess of 100° F. on occasion. An average of about 20 days annually have maximum temperatures of 90° F. or higher.

[1] The authors are indebted to W. L. Denmark and D. E. Wuerch, former state climatologists for Illinois, National Weather Service, for information in this section.

TABLE 1. — TEMPERATURE AND PRECIPITATION DATA (1931-1969)[a]

Month	Temperature					Inches of precipitation		
	Means			Record high, °F.	Record low, °F.	Mean monthly	Greatest daily amount	Mean monthly snowfall
	Daily max., °F.	Daily min., °F.	Monthly, °F.					
Jan.	30.7	12.9	21.8	61	−26	1.73	1.80	8.5
Feb.	34.0	16.1	25.0	63	−26	1.20	1.66	6.3
March	45.1	25.5	35.3	81	−16	2.24	1.56	7.6
April	60.8	37.3	49.0	91	11	3.18	1.84	1.3
May	72.1	47.9	60.0	104	23	3.86	2.87	.1
June	81.3	58.0	69.6	104	35	4.74	3.90	0
July	85.5	61.5	73.5	108	42	3.91	3.29	0
Aug.	83.4	59.7	71.5	103	33	3.49	3.58	0
Sept.	75.3	51.9	63.6	99	24	3.55	5.00	0
Oct.	64.8	41.2	53.0	88	12	2.45	3.85	.1
Nov.	47.4	28.8	38.1	79	− 9	2.37	3.92	2.2
Dec.	33.9	17.8	25.8	66	−26	1.85	1.56	8.7
Year	59.5	38.2	48.9	108	−26	34.57[b]	5.00	34.8[b]

[a] Based on records at Mt. Carroll, Illinois, Station.
[b] Mean annual total.

TABLE 2. — FREEZE PROBABILITIES IN CARROLL COUNTY (11)

Probability	32° F.	28° F.	24° F.	20° F.	16° F.
Last in Spring					
Average date	May 5	Apr. 23	Apr. 8	Mar. 27	Mar. 13
25 percent chance after	May 14	May 2	Apr. 17	Apr. 5	Mar. 22
10 percent chance after	May 22	May 10	Apr. 25	Apr. 13	Mar. 30
First in Fall					
Average date	Oct. 5	Oct. 15	Oct. 30	Nov. 8	Nov. 19
25 percent chance before	Sept. 26	Oct. 6	Oct. 21	Oct. 30	Nov. 10
10 percent chance before	Sept. 19	Sept. 29	Oct. 13	Oct. 22	Nov. 2

January is normally the coldest month. February often has days as cold as January, but cold spells are usually of shorter duration. Temperatures below 0° F. occur each winter. All winter months, December through February, have had temperatures colder than −25° F. on occasion. The coldest official temperature ever recorded in Illinois was the −35° F. at Mt. Carroll on January 22, 1930.

The number of days between the average date of the last freezing temperature (32° F. or below) in spring and the average date of the first such occurrence in fall has been termed the "growing season." This averages approximately 152 days in Carroll County. The "growing season" designation is misleading, as different crops have different temperatures at which growth is affected. Table 2 indicates the probability of several different threshold temperatures. Temperatures often vary considerably between ridge and valley locations during radiation freezes, the type most common in Illinois.

CULTURAL FEATURES OF CARROLL COUNTY

Organization and Population

Carroll County was established by law on February 22, 1839, after having been part of Jo Daviess County since 1827. The first settlement in what is now Carroll County was at the present site of Savanna in 1828. Early trails, fords, and bridges in the county resulted primarily from travel across the area to the lead-mining activities near Galena in Jo Daviess County.

The county was named after Charles Carroll of Carrollton by early settlers from Maryland. Charles Carroll was a well-known statesman of the Revolutionary period, a signer of the Declaration of Independence, and United States Senator from Maryland.

Savanna was the first county seat, but since 1843 the county seat has been Mt. Carroll.

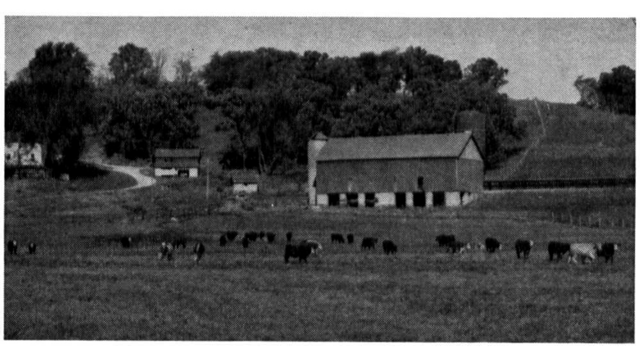
Although the major battles of the Blackhawk War in 1832 were not fought in the area, some troubles with small bands of local Indians occurred. By 1833 trouble with the Indians had ended and population began to increase.

Data from the 1970 United States Census indicates the population of the county to be 19,276. This is an increase of 1,289 over 1940 data, but 231 less than in 1960. In 1970 the population of the major towns was Savanna, 4,942; Mt. Carroll, 2,143; Lanark, 1,495; Milledgeville, 1,130; Shannon, 848; Thomson, 617; and Chadwick, 605.

Transportation, Industrial, and Other Developments

Transportation facilities are well developed in Carroll County for transporting agricultural and industrial products. Railroads and paved highways (one federal and several state) traverse the county in several directions with direct routes to major cities. Most secondary roads are covered with all-weather surface material, primarily blacktop or crushed rock. Savanna, once a bustling railroad center, is still a center and stop for two major trans-continental lines. The Mississippi River, on the western border, has a heavy barge traffic. Stransky Memorial Airport, located south of Savanna, has facilities for many private planes.

Industry is not well developed. Savanna, the largest city, has the bulk of the industry, but most of the smaller towns have some. These have included the manufacture of valves and controls, locks, batteries, apparel, wood products, small automotive parts, wrought iron products, and fish-worm bedding (*21*). The processing of milk into Swiss cheese and whey concentrate, feed grinding, meat processing, and livestock trucking are also important in the county. The Savanna Army Ordnance Depot, established in 1917 and located partly in the northwestern corner of the county, has provided important civilian employment for the county. Many people are employed in larger cities outside the county and commute.



Raising and feeding beef cattle are important enterprises in areas of sloping land. (Fig. 5).

In 1938, Dam No. 13 on the Mississippi River below Thomson was constructed by the U.S. Corps of Army Engineers, creating the 3,000-acre Spring Lake. This area, including many islands, is part of the Upper Mississippi River Federal Game Preserve. This preserve, the Mississippi Palisades State Park north of Savanna, and other private and public recreation areas make Carroll County an attractive all-year recreation center for tourists.

Shimer College, located in Mt. Carroll, is an accredited four-year liberal arts college. Founded in 1852 as Mount Carroll Seminary, it was for many years a two-year college for girls.

Agriculture

Agriculture has always been the major industry in Carroll County. This is due to the high percentage of productive soils, good transportation facilities, nearby markets, and a favorable climate.

Although cash grain farming has increased, most of Carroll County, because of its sloping topography, is well adapted to combination grain and livestock farming, and a high percentage of farm income is derived from livestock and livestock products.

In keeping with trends elsewhere, the total number of farms has decreased but the average size of the farm has increased. In 1920 there were 1,769 farms, averaging about 153 acres per farm. In 1969 farms had decreased to 1,127 with an average size of about 222 acres. Corn and especially soybean acreages had increased with offsetting reductions in oat and hay acreages. In 1972, according to the Illinois Cooperative Crop Reporting Service (*9*), the acreage and average acre yield of major crops were corn (for grain), 108,400 acres at 102 bushels; soybeans, 9,600 acres at 34 bushels; oats, 12,800 acres at 61 bushels; and all hay, 24,100 acres at 3.6 tons. Small acreages of wheat, barley, and rye were harvested, and vegetables, melons, and other fruits were produced in small quantities. Farm value of grain and hay in 1972 was approximately $18,902,900.

Hogs, beef and dairy cattle, sheep, and chickens are all important animal industries. Dairy cattle, and especially laying hens, have decreased in number in recent years, however. Sheep numbers now average only about 3,500 head, making hogs and cattle the most important livestock enterprises. Value of cattle, hogs, and sheep on farms in 1972 was approximately $28,685,600.

Modern farming operations utilize large amounts of fertilizers and various pesticides. Irrigation has been practiced very little and only on a few acres, mainly on the sandy terraces adjacent to the Mississippi River. Most originally forested areas have been cleared, but some areas of the county still remain in native forest. It has been estimated that about 20,000 acres can be classified as woodland or woodland pasture.

GENERAL SOIL AREAS OF CARROLL COUNTY

The location and extent of the 13 general soil areas or soil associations in Carroll County are shown on the general soil map (page 137). A soil association is a landscape that contains two or more soils in a distinctive proportional pattern. Depending upon their extent, the soils are considered as major or minor. The soil associations are named for the major or more extensive soils.

A map showing soil associations is useful to people who want a broad picture of the soil resources and soil conditions in the entire county. Such a map is useful for comparing different parts of a county, indicating the location of large tracts suited for a certain kind of land use, and serving as a general guide in managing a watershed, wildlife area, or forested tract or in planning engineering works, recreational facilities, and community developments. A soil association map is too general to indicate soil conditions for adequate planning and management of an individual farm or field or for selecting a site for the exact location of structures or roads. The soils in any one association ordinarily differ in slope, depth, natural drainage, and other characteristics which are very important in their management.

The soil associations in Carroll County are discussed individually on the following pages.

Area A — Tama-Muscatine Association

The soils of this association are poorly to well drained, level to strongly sloping, with moderately developed B or subsoil horizons. They developed in more than 5 feet of loess under prairie vegetation. This association occurs primarily in the uplands, but some loess-covered terraces are included.

This association comprises about 33 percent of the county and occurs mainly in the eastern portion. Tama soils occupy the gently sloping ridgetops to strongly sloping side slopes and are well drained to moderately well drained. Muscatine soils occupy level to gently sloping areas and are somewhat poorly drained.

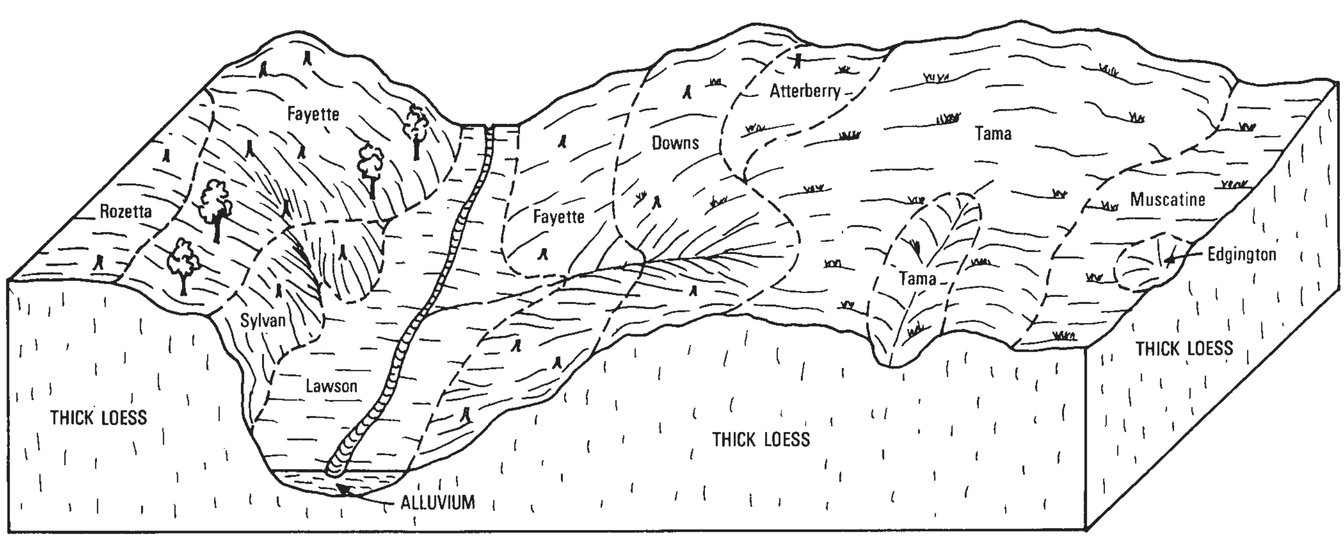
Other soils commonly occurring in this association are Ashdale, Atterberry, Downs, Edgington, Ogle, and Sable. Ashdale has dolomitic bedrock at less than 5 feet. Atterberry and Downs occur on the prairie-forest borders or in areas where forest vegetation has influenced development. Atterberry is somewhat poorly drained and Downs is well and moderately well drained. Edgington occurs in small closed depressions or in level areas in the upland and occasionally on terraces, has a distinctive A2 horizon, and is poorly drained. Ogle soils are well drained and occur where the loess is thinner than 5 feet over glacial till. Sable occurs in level areas or in the upper ends of drainageways, has a thick, dark surface, and is poorly drained.

The soils in this association are used primarily for cultivated and forage crops. Corn and soybeans are grown extensively along with small grains and legume-grass mixtures. Erosion is a major concern in soil management, and artificial drainage is required in some areas. Soils of this association are among the most productive in the county.

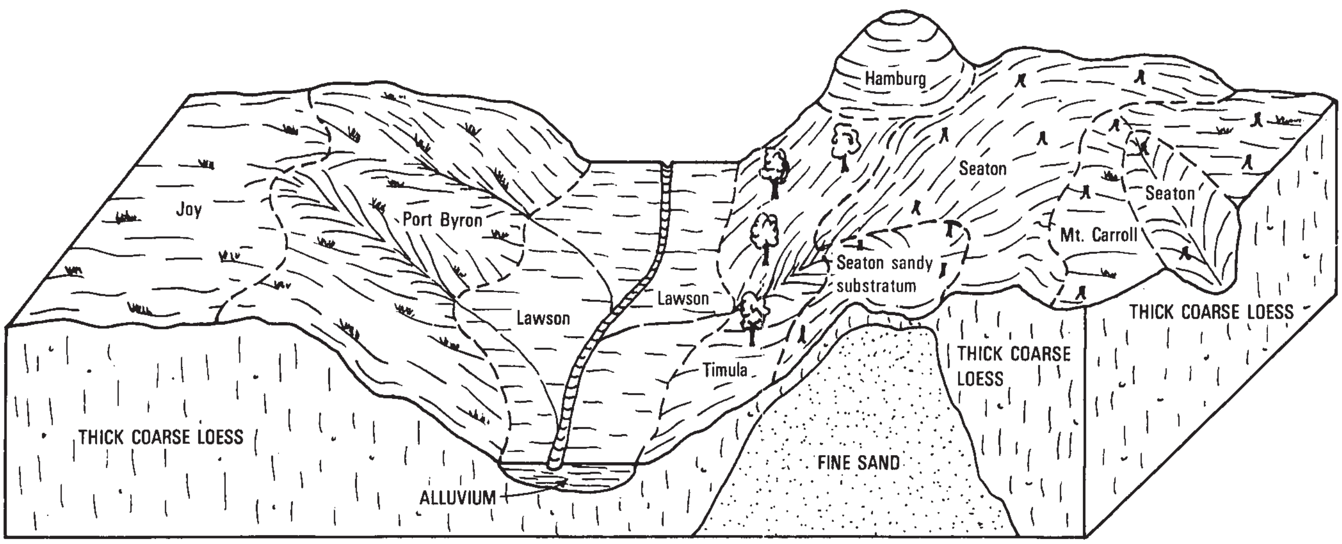
Area B — Fayette-Rozetta Association

This association is composed mainly of moderately well-drained to well-drained soils that are gently sloping to very steep. They have moderately developed B or subsoil horizons and have developed primarily in loess greater than 5 feet thick under forest vegetation in upland positions.

Approximately 24 percent of the county is made up of this association, which occurs mainly across the central portion on a northwest to southeast axis. Fay-



Landscape relationship of important soils in soil associations A and B. (Fig. 6)



Landscape relationship of important soils in soil associations C and D. (Fig. 7)

ette soils are extensive on gently sloping ridgetops to very steep valley slopes and are well drained. Rozetta is moderately well drained and occurs mainly on level to gently sloping areas and occasionally on moderately sloping side slopes.

Other soils commonly occurring in this association are Downs, Flagg, Palsgrove, and Sylvan. Downs soils are transitional to soils developed under grass vegetation and are darker colored and have a higher organic matter content than most soils in the association. Flagg occurs in areas where loess thins to less than 5 feet over glacial till; Palsgrove soils have dolomitic bedrock at less than 5 feet. Sylvan soils occur on very strongly sloping to very steep areas which are usually moderately to severely eroded. Sylvan soils have thin sola, and loess containing carbonates normally occurs by depths of 40 inches.

The tillable areas of this association are moderately productive, and erosion control is a major problem. Many slopes are too steep for cultivation and are best used for permanent pasture or trees.

Area C — Port Byron-Joy Association

Association C is made up of somewhat poorly to well-drained soils, occurring on very gently sloping to strongly sloping topography and having developed under grass vegetation in upland areas. They have developed in recently deposited thick loess (greater than 5 feet) and have weakly developed B or subsoil horizons of silt loam. They are similar to soils in Association A, differing primarily by having more weakly developed profiles with less clay in the B horizons.

This association occupies only about 2 percent of the county, occurring primarily in Fairhaven (T23N, R5E) and Mt. Carroll (T24N, R4E) Townships. Port Byron soils are the most extensive and occur on gently sloping ridgetops to strongly sloping side slopes. They are usually well drained but occasionally moderately well drained. The Joy soils are on level to gently sloping areas and are somewhat poorly drained.

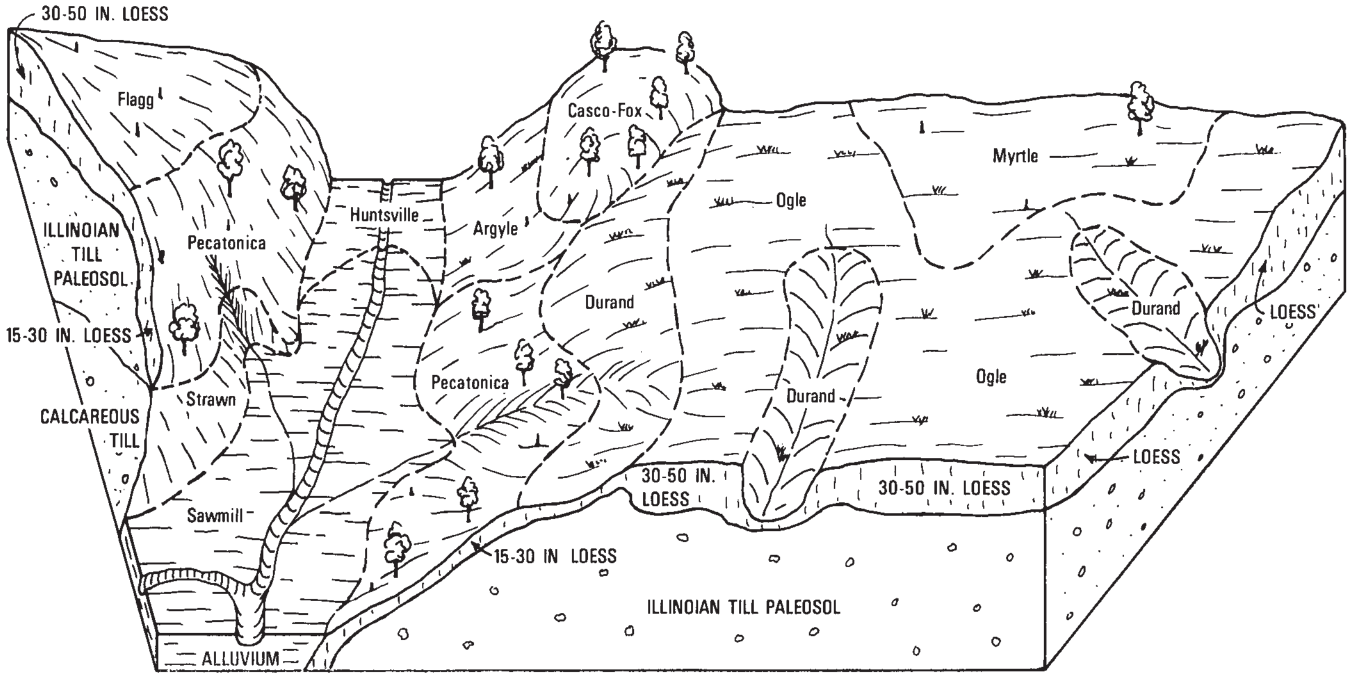
Mt. Carroll; Port Byron, sandy substratum; and Loran soils are minor soils in this association. Mt. Carroll soils occur on the prairie-forest borders or in areas where forest vegetation has had some effect on profile development. Port Byron, sandy substratum soils have sand or loamy sand material usually at depths of 40 to 60 inches. Loran soils occur in portions of this association northwest of Wacker in Mt. Carroll Township. They are somewhat poorly drained, as are the Joy soils, but tend to occur on steeper slopes ranging from 4 to 12 percent and have fine-textured, soft shale bedrock at depths of about 30 to 50 inches.

The soils in this association are used primarily for cultivated and forage crops. Good soil management requires practices which control erosion. These soils have moderate to moderately high productivity.

Area D — Seaton-Timula Association

The soils of this association are primarily well drained, gently sloping to very steep, and light colored, having developed under forest vegetation. They have developed in recently deposited thick loess (greater than 5 feet) and have weakly developed B or subsoil horizons. They differ from soils in Soil Association B primarily by having more weakly developed profiles with less clay in the B horizons, which have silt loam textures.

This association occurs in the uplands in a narrow belt with a north-south direction on, and just in back of, the Mississippi River bluffs. It is strongly dissected. It comprises about 6 percent of the county. Seaton soils make up a large part of this association, occurring



Landscape relationship of important soils in soil associations E and F. **(Fig. 8)**

on gently sloping ridgetops to very steep valley slopes. They are well drained. Well-drained Timula soils occur on very strongly sloping to very steep slopes, often very close to the bluff and on the bluff face. They have very thin, weakly developed profiles with calcareous loess occurring at depths of 18 to 40 inches.

Minor soils in this association are Chute, Hamburg, and Seaton, sandy substratum. Chute soils occur in small areas just behind the bluff, are dominately fine sand and excessively drained, and contain carbonates on or very near the soil surface. Hamburg soils occur usually on the bluff face, often just above steep slopes that are shallow to bedrock. They are silty, somewhat excessively drained, and contain carbonates on or very near the soil surface. Seaton, sandy substratum soils occur occasionally where loess is about 40 to less than 60 inches thick over sand or loamy sand sediments.

The major soils are moderately productive, but much of the association is too steeply sloping for cultivated crops. Most cultivated areas are on ridgetops or in narrow valleys. Many areas are used for hay or pasture and the steeper slopes remain in forest. Most farms in the area support livestock production.

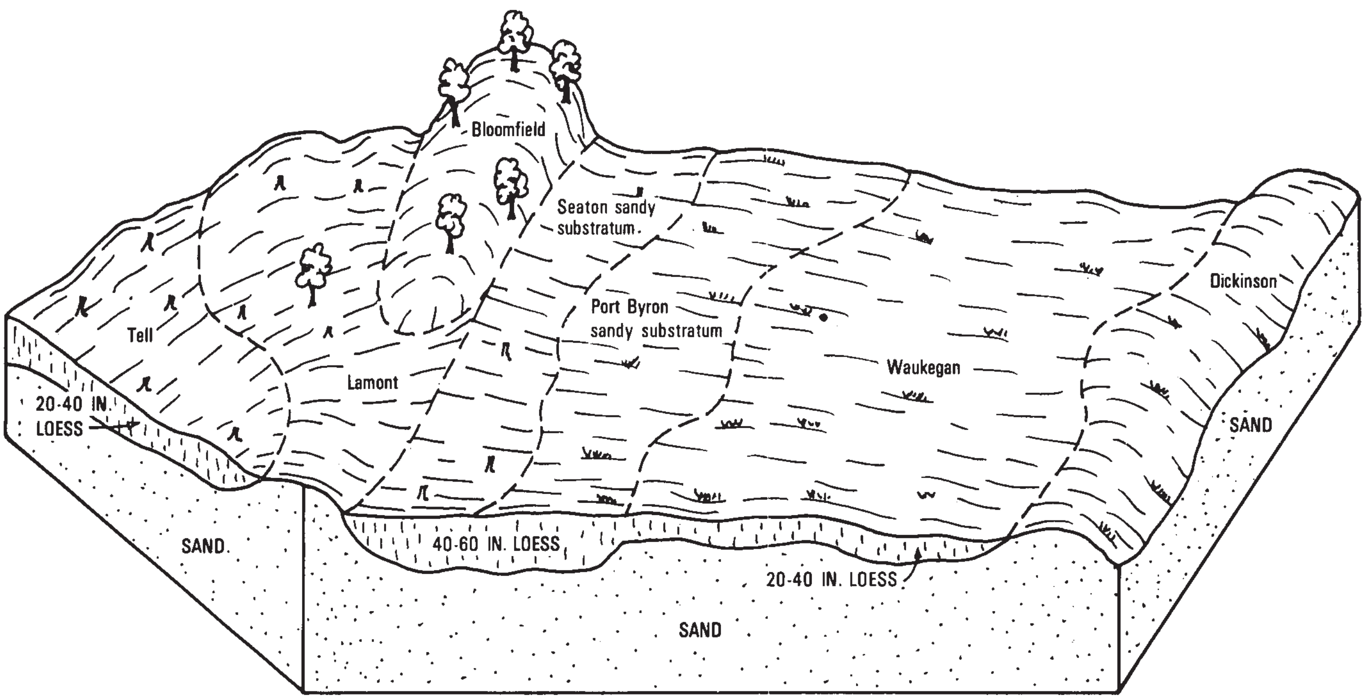
Area E — Ogle-Durand Association

Ogle and Durand are the major soils in this association, which contains soils that are primarily well drained, moderately sloping to very strongly sloping; they occur in the upland and developed under grass vegetation. These soils are developed from loess over glacial drift parent materials with the profiles occurring in both materials.

These soils make up about 2 percent of the county and occur mainly in small areas in the eastern one-third of the county. There are also areas in the southwestern part of the county in eastern York Township (T23N, R3+4E) and in Mt. Carroll Township (T24N, R4E) that contain mainly the Ogle, silt loam subsoil variant. The Ogle soils and the Ogle, silt loam subsoil variant have developed in about 30 to 50 inches of loess over glacial drift, primarily till. The silt loam subsoil variant has less clay accumulation in the portion of the B horizon developed in loess. The Durand soils are developed in thinner loess over till, their loess thickness being about 15 to 25 or 30 inches. Solum thickness of Ogle and Durand soils is normally greater than 4 feet and may be greater than 8 feet in places.

Minor soils in the association are Argyle, Coatsburg, Hitt, and Myrtle. Argyle is similar to Durand but has a lighter colored surface due to some forest influence. Coatsburg occurs occasionally in this association; it is a poorly drained soil occurring on side slopes. The till or drift portion of the profile is brownish gray or gray and has a higher clay content than the well-drained soils. Hitt is similar to Durand soils but has dolomitic bedrock at about 40 to 60 inches. Myrtle is similar to the Ogle soils but has a lighter colored surface and developed under mixed grassland and forest vegetation.

These soils are used mainly for cultivated crops, small grains, and legume-grass mixtures. Productivity ranges from high to moderate with the most productive soils occurring on the ridgetops where the loess cover is greatest. Erosion is a major management problem, and some eroded areas have lost the loess cover.



Landscape relationship of important soils in soil associations G and H. (Fig. 9)

Area F — Flagg-Pecatonica Association

This association is similar to Association E except that the soils have developed under forest and are therefore lighter colored and lower in organic matter content. The soils of this association are naturally well drained and occur in upland areas on slopes ranging from gently sloping to very steep but mainly moderately sloping or greater. The soils are developed from loess and the underlying glacial drift.

This is a small association, comprising about 2 percent of the county. It occurs in small areas in the extréme eastern part and in the uplands in the southwest and west-central portions. Flagg soils have developed in about 30 to 50 inches of loess over the glacial deposits, and Pecatonica has a thinner loess cover of about 15 to 25 or 30 inches. The thickness of the solum, or the combined A and B horizon, is normally at least 4 feet but may be 8 or more feet.

Minor soils are Casco, Fox, Myrtle, Rodman, and Strawn. Casco, Fox, and Rodman soils are developed from thin or no loess over gravelly materials; Fox is the deepest soil and Rodman the most shallow of the three. Myrtle is similar to Flagg but has a darker surface. The Strawn soils occur mainly on strongly sloping to steep, short slopes. They have thin sola, and calcareous till normally occurs at 2 feet or less.

Many areas are not well adapted to cultivated crops, and livestock farming is common. Soil productivity is moderate on ridgetops but much lower on the sloping areas. Well-managed hayland yields well, and many areas are used for permanent pasture or remain in forest.

Area G — Waukegan-Dickinson Association

This association occurs only in York (T23N, R3+4E) and Fairhaven (T23N, R5E) Townships. The soils in this association are well to somewhat excessively drained, nearly level to very strongly sloping, and dark colored, having developed under grass vegetation. It occurs in the upland where water-deposited and wind-deposited sand accumulated and then was covered in most places by a thin loess cover. In places loess is nonexistent and in most places is less than 5 feet thick. Low dunes occur in places, and the topography has a complex slope pattern of ridges, swales, and some closed depressions.

Waukegan and Dickinson are the major soils. Dickinson soils have sandy loam A and B horizons over sandy C horizons. Waukegan soils have about 20 to 40 inches of loess over loamy sand or sand sediments. The entire association is small, making up about 2 percent of the county.

Port Byron, sandy substratum soils also occur in the area and are developed in loess thicknesses of about 40 to less than 60 inches over the sandy sediments.

The less sloping areas with the thickest loess cover are adapted to the major crops of the area and are moderately productive. The more sloping areas and those with sandy loam surface textures are moderately low in productivity and are less intensively cultivated.

Area H — Tell-Lamont Association

These soils are mainly well to somewhat excessively drained, nearly level to very strongly sloping, and light

colored, having developed under forest vegetation. They have developed in parent materials similar to those of the soils in Association G, that is, in the upland wind- and water-deposited sand that, in places, has no loess mantle but in other areas may have almost 5 feet of loess cover. Low, longitudinal dunes occur in places, and the slope pattern is complex with closed depressions occurring in some places. The association occurs primarily in uplands in the southwestern and west-central part of the county, but one small area occurs in the northwestern part in Washington Township (T25N, R3E). This association comprises about 3 percent of the county.

Tell and Lamont are the major soils. Tell soils are developed in about 20 to 40 inches of loess over loamy sand or sand materials. The Lamont soils have sandy loam A and B horizons over more sandy C horizons.

Other soils include Seaton, sandy substratum and the Bloomfield and Plainfield soils. Seaton, sandy substratum soils are developed in loess thicknesses of 40 to 60 inches over the sandy sediments. Bloomfield and Plainfield soils occur on the very sandy dunes and ridges and are occasionally associated with blow-outs. Bloomfield soils differ from Plainfield soils in having weak B horizons in the form of reddish-brown bands in which the sand grains are cemented weakly by clay and iron compounds.

Productivity in this association is extremely variable and many areas are best adapted to permanent pasture or woodland. Serious gullying has occurred in some areas where sand underlying thin loess has encouraged undercutting by water. In such cases gullies are rapidly enlarged through down-cutting and headward extension.

Area I — Palsgrove-Dubuque-Dunbarton-Sogn Association

A variety of soils which have bedrock within their profiles makes up this association. These soils are dominantly light colored, having developed under forest vegetation, and have formed in thin loess, glacial drift, or a combination of these over dolomitic limestone. The bedrock also includes shale in several areas. A very small amount of sandstone occurs in the area on the eastern border of the county. These are dominantly well-drained soils, except for some of the shale areas, and slopes range from moderately sloping to very steep. The association comprises about 12 percent of the county. Although some small areas occur in a scattered pattern in the western part, the largest continuous areas occur in the north-central portion of the county in areas drained by the Plum River.

The major soils are Palsgrove, Dubuque, Dunbarton, and Sogn. They differ mainly in the thickness of their sola and depth to rock. They are developed primarily from loess and the underlying rock. Limestone occurs at 40- to 60-inch depths in Palsgrove soils, 20- to 40-inch depths in Dubuque soils, and less than 20 inches in Dunbarton soils. Sogn soils have a thin surface or A horizon resting directly on limestone, and the surface color is usually darker than the other soils.

Minor soils are Woodbine, Eleroy, Derinda, Keltner, Loran, and Gale soils. Woodbine is developed usually in thin loess and glacial drift with limestone rock occurring between 40 and 60 inches. Eleroy and Derinda soils are developed from differing loess thicknesses over shale bedrock. Keltner soils, also developed from loess and shale, are similar to Eleroy soils, but are dark colored. Loran soils are developed from loess over shale and are somewhat poorly drained. Gale soils are developed from loess over sandstone bedrock and are of very minor occurrence.

Drainage is occasionally a problem only in small seep areas where shale parent materials occur closer to the surface than normal in the Derinda, Eleroy, Keltner, and Loran soils. Because of the dominance of sloping areas, erosion control is a major concern. Livestock farming is important in this association. Soils on ridgetop positions are moderately productive when well managed, the soils on the valley slopes are cultivated where not too steep or stony, but many areas are best suited for permanent pasture or timber.

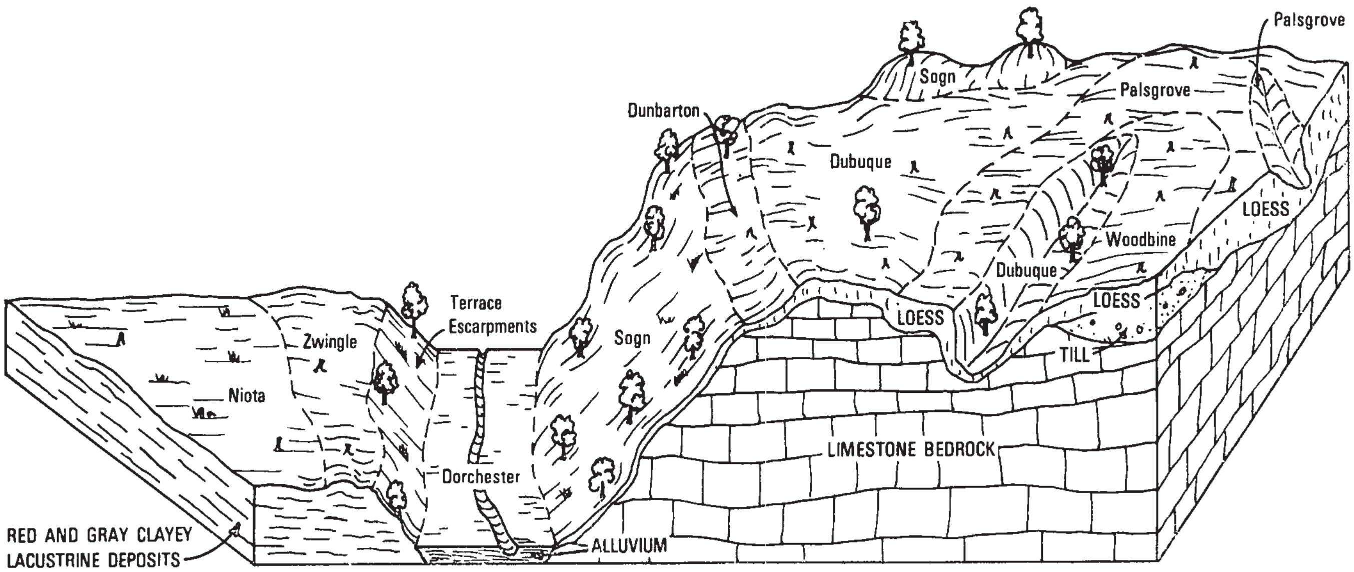
Because of variations in depth to rock, complexes or undifferentiated units containing two series are used commonly in these areas on the detailed maps. A cherty variant of Dunbarton soils occurs in areas where chert in surface horizons interferes with cultivation.

Area J — Littleton-Worthen Association

This association comprises about 3 percent of Carroll County and occurs mainly in the southwestern part with smaller areas in the northwestern part. The soils are dominantly dark colored, having developed mainly under grass vegetation. They are mainly somewhat poorly, moderately well, and well drained but include small areas of poorly drained soils. The parent materials are primarily silty water deposits, occurring on broad terrace or outwash areas or on footslope positions. Soil development is comparatively weak. Slopes are dominantly level to moderately sloping, but steeper slopes are included in some areas.

Littleton and Worthen are the major soils. Both have developed in silty sediments that are usually 5 feet thick or more, but stratification with more loamy materials sometimes occurs below about 4 feet. Littleton is somewhat poorly drained and Worthen is moderately well to well drained. Worthen occupies the higher and more sloping portion of the landscape.

Minor soils include Drummer, Drury, Palms, Tell, and Waukegan. Drummer soils occur in a few low-lying, poorly drained positions and have silty clay loam textures in the solum. Palms soils have a high organic matter content and occupy significant areas



Landscape relationship of important soils in soil associations I and K. (Fig. 10)

in northern York Township (T23N, R3+4E) that were originally swampy but have been drained. Drury soils are similar to Worthen but have light-colored surfaces and in this association occupy areas that were originally forested. Tell and Waukegan soils occur in areas where sandy deposits occur at less than 40 inches below silty upper material. Tell soils are light colored; Waukegan soils are dark colored.

This association is intensively cultivated and the major soils have moderately high to high productivity. Artificial drainage is required in some areas; erosion control is a management concern on a relatively few steeper slopes.

Area K — Niota-Zwingle Association

This smallest association, occupying about 1 percent of the county, is made up mainly of poorly and somewhat poorly drained soils developed in silty clay to clay lacustrine deposits. They occur primarily on terrace bench positions along the lower part of the Plum River in an area which was originally a lake. Although minor in acreage, they are distinctly different from the other soils of the area. The lacustrine parent materials are both red and gray and in places are interlayered or stratified. These materials are high in clay in the upper part, usually silty clay or clay in texture, and become coarser textured with depth. The surface horizons of these soils are generally dark to moderately dark. They were probably sparsely forested for a short time, but the wetter, more poorly drained areas were probably developed under grass.

The major soils are Niota and Zwingle. The Niota soils have silty A1 and A2 horizons that are believed to be the result of thin loess deposits over the lacustrine deposits in places. The Niota, clayey subsurface variant soils lack the silty surface or A2 horizons but have fine-textured surface horizons, usually silty clay or silty clay loam. Zwingle soils are similar to Niota soils in that the surface horizons were probably developed in loess; however, their surface horizons are generally lighter colored than Niota soils, and some areas have better natural drainage.

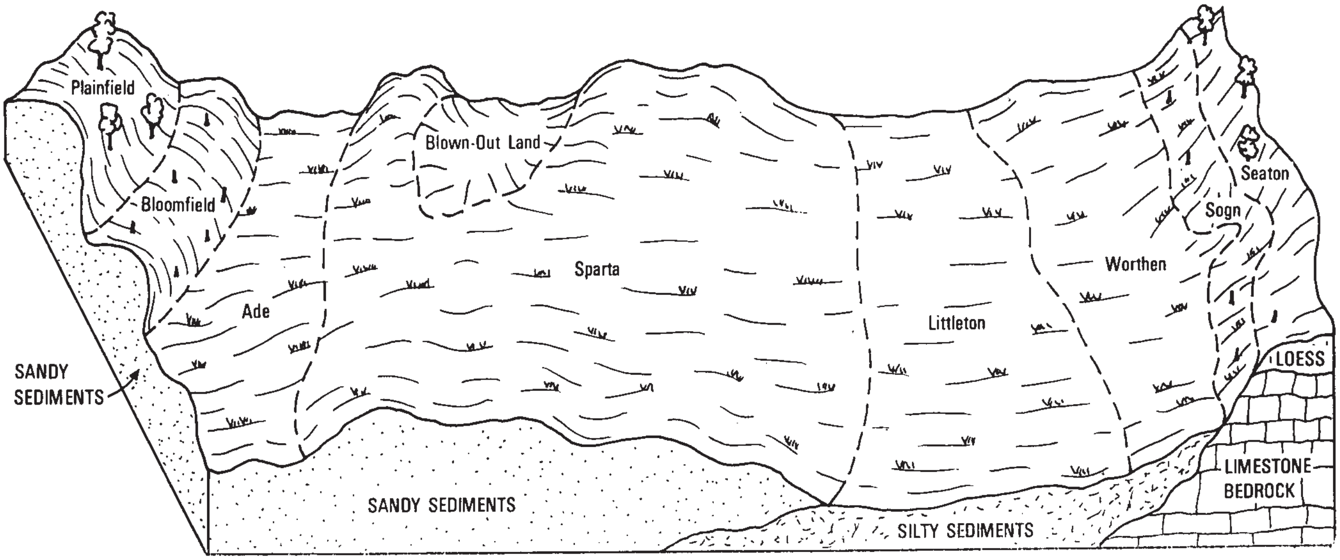
The Terrace Escarpment land type is a minor soil in this association. It is a highly variable soil that occurs on short, steep slopes at the border between the terraces and the stream bottoms.

Most of this association is poorly drained with most of the soils having very slow permeability. The level and gently sloping areas are used mainly for growing corn, oats, and hay. The Terrace Escarpments are variable in drainage and permeability; where cultivated, they are highly susceptible to erosion, and many areas are used for hay or pasture. Productivity of soils in this association is variable and highly dependent on management and on rainfall distribution during the growing season.

Area L — Sparta-Ade Association

This association is composed mainly of somewhat excessively to excessively drained soils that occur on level to very strongly sloping areas on terraces adjacent to the Mississippi River. The soils have developed mainly from water-deposited sand and loamy sand parent materials with some areas subsequently reworked by wind. Most of the soils are dark colored, having developed under grass vegetation.

Approximately 4 percent of the county is made up of this association. Sparta soils have weakly developed profiles that are very sandy. The Ade soils are also very sandy but differ in having weakly developed bands in the subsoil which have a higher clay and iron content than the rest of the profile.



Landscape relationship of important soils in soil associations J and L. (Fig. 11)

Minor soils include Blown-Out Land, Dickinson, Gilford, Hoopeston, and Selma soils and Onarga, reddish subsoil variant. Blown-Out Land includes areas where recent wind erosion has removed any developed soil profiles. The Dickinson and Onarga, reddish subsoil variant soils are not as sandy as the Sparta and Ade soils and are dominated by sandy loam textures. The Onarga, reddish subsoil variant has a sandy clay loam to clay loam B horizon. The Gilford and Selma soils occur in the few areas that are poorly drained and have a high water table. They have greater available water capacities than the other sandy soils. The Hoopeston soils have sandy loam surface and subsoil horizons and are somewhat poorly drained. A few light-colored areas, including the forested soils Plainfield and Bloomfield, occur in this association in Washington Township in the northwestern part of the county.

Except for a very few minor areas, this association is characterized by drouthy soils that lack well-developed subsoils and are subject to wind erosion. They are best adapted to forage crops and early maturing small grains. Melons are grown in the vicinity of Thomson, and a few plantings for Christmas trees also occur in this area. Excellent management and careful use of fertilizers are required to successfully grow cultivated crops even in seasons of well-distributed rainfall. Wind erosion is a major management concern. Productivity is highly variable, depending on the crops grown, management, and seasonal rainfall distribution.

Area M — Lawson-Dorchester-Sawmill Association

A wide variety of alluvial or bottomland soils make up this association, which occurs in the flood plains of the major streams throughout Carroll County. Most of these soils are dark to moderately dark colored and are level to gently sloping. This association comprises about 6 percent of the county.

Lawson soils are dark colored, somewhat poorly drained, and derived from recent, neutral silty sediments. They are important soils in the stream bottoms in the eastern half of the county. Dorchester soils are dark to moderately dark colored and in Carroll County are moderately well to somewhat poorly drained. They are weakly calcareous and contain throughout their sola small particles of dolomite derived from the adjacent upland slopes. Dorchester is a major soil along Plum River, Camp Creek, and the lower portions of Johnson and Carroll Creeks. Sawmill soils are dark colored, poorly drained, and derived from neutral silty clay loam sediments; they occur in the flood plain along many of the streams but are dominant along Lost Creek northeast of Shannon and in the broad alluvial areas southeast of Thomson.

Minor soils include Huntsville, which is dark colored, moderately well to well drained, and silt loam textured; Millington, which is dark colored, poorly drained, loam textured, and calcareous, containing snail shells and fragments; Orion, which is light colored, somewhat poorly drained, and silt loam textured; Otter, which is dark colored, poorly drained, and silty textured; and Wakeland, which is light colored, somewhat poorly drained, and silt loam textured. Orion soils differ from Wakeland soils in having dark-colored sediments at depths of 20 to 40 inches. Lena and Palms are organic soils that often occur as small areas in the bottomlands. Lena is calcareous. Palms is neutral, and the organic matter is underlain by loamy mineral matter at depths below 16 inches but above 50 inches. Dorchester, cobbly subsoil variant occurs mainly in the upper ends of drainageways where large pieces of dolomite bedrock and chert occur in the

stream alluvium at depths of about 2 to 4 feet. Mixed Alluvial Land occupies areas of difficult accessibility adjacent to the Mississippi River and on islands in the river. A few cultivated areas were included in this land type in southwestern Carroll County where recent sandy sediments were deposited over finer textured materials.

Soils of this association are adapted to major crops of the area if the soils are adequately drained and protected from overflow. Many areas, however, are maintained as pastureland because of wetness or overflow hazard. Where they are protected and can be cultivated, these soils have high to very high productivity.

DESCRIPTIONS OF CARROLL COUNTY SOILS

The soil series and land types are described and discussed in alphabetical order in this section. A representative profile description for each of the soil series is given. The profile characteristics are for an extensive mapping unit, usually a unit which has not been altered a great deal by erosion. If the series has more than one mapping unit, these are listed according to the symbols used on the soil map sheets. The explanation of slope and erosion symbols (page 1) indicates how the additional mapping units differ from the representative profile. Information on general occurrence, formation, relationship to other soils, and special properties is given for each series or land type.

The horizon designations used in the profile descriptions are discussed on page 2 and in the Glossary on page 128.

In the profile descriptions, Munsell color notations and consistence are for moist soils. The color notations refer to soil color standards developed by the Munsell Color Company, Inc. The notations consist of three variables: hue, value, and chroma. In the notation 10YR 3/2, for example, the hue is denoted by 10YR (YR = yellow-red), the value by 3, and the chroma by 2. Hue is the dominant spectral (rainbow) color and is related to the dominant wave length of light. Value refers to the relative lightness of color and is a function of the total amount of light. Chroma is the relative purity or strength of the spectral color.

The names of the mapping units, arranged in numerical order, are given in the Guide to Mapping Units (pages 131 to 136). The area of each mapping unit (combination of soil series, slope, and erosion) and each series is given in Table 4 (pages 71 to 78).

To aid readers in understanding similarities and differences among the many soil series, Table 3 arranges the soil series according to parent materials, native vegetation or surface color, degree of B horizon development, and natural drainage class.

Ade Series (98)

The Ade series consists of deep, dark-colored soils that are somewhat excessively drained. They occupy nearly level areas to rolling or strongly sloping dunes in the uplands and on stream terraces, dominantly in the southwestern part of the county but also in the extreme northwestern part. They have formed from sandy material under grass vegetation. They are primarily used for corn, oats, and hay, but in some areas melons, pumpkins, and Christmas trees are grown.

The Ade soils are geographically associated with Sparta, Dickinson, and Hoopeston soils. The better drained Ade, Sparta, and Dickinson soils occupy similar nearly level and sloping dune positions. Hoopeston soils are somewhat poorly drained and occur in nearly level areas. Ade soils have clay-iron bands or lamellae above 60 inches in the profile, which Sparta soils lack. Ade soils are sandier in their surfaces and subsoils than Dickinson or Hoopeston soils.

The Ade soils have rapid permeability and low available water capacity. They are limited for septic tank filter fields because their rapid permeability could permit effluent to pollute water sources. Ade soils provide a source of sand.

Included in the mapping of this series are some level and depressional areas that have dark surface horizons thicker than 2 feet. A few areas lack the clay-iron lamellae but were included with Ade because their available water capacity was considered to be more like Ade than Sparta soils.

The mapping units that occur in Carroll County are 98A, 98B, 98C, and 98D.

Ade loamy fine sand representative profile (98B):

Ap (0-9") Very dark brown (10YR 2/2) loamy fine sand; weak, medium, granular structure; very friable; slightly acid; abrupt, smooth boundary.

A12 (9-20") Very dark grayish-brown (10YR 3/2) loamy fine sand; weak, medium, granular structure; very friable; slightly acid; clear, smooth boundary.

B1 (20-40") Brown and dark yellowish-brown (10YR 4/3 and 3/4) loamy fine sand; weak, fine and medium, subangular blocky structure (nearly single grained); very friable to loose; slightly acid; gradual, smooth boundary.

A + Bt (40-65") Dark yellowish-brown and yellowish-brown (10YR 4/4 and 5/4) fine sand; single grained; loose (A horizon non-band material); dark brown (7.5YR 4/4) loamy fine sand; weak, fine, subangular blocky structure; very friable to loose (Bt clay-iron lamellae or bands); slightly acid; gradual, wavy boundary. Bt lamellae average ½ to 1 inch thick.

C (65-77" +) Yellowish-brown (10YR 5/4) fine sand; single grained; loose; neutral.

TABLE 3. — CARROLL COUNTY SOILS: Parent Materials, Surface Color, Degree of Development, and Natural Soil Drainage

Parent material of soil profile	Soil assoc. area	Surface color	Degree of B horizon development	Natural drainage class[a] and soil series[b]
Loess five feet or more thick, calcareous below 42 in., usually below 60 in.	A	Dark	Moderate	W & MW-Tama (36), SP-Muscatine (41), P-Sable (68), Edgington (272)
	A & B	Mod. Dark	Moderate	W & MW-Downs (386), SP-Atterberry (61)
	B	Light	Moderate	W-Fayette (280), MW-Rozetta (279)
	C	Dark	Weak	W & MW-Port Byron (277), SP-Joy (275)
	C & D	Mod. Dark	Weak	W & MW-Mt. Carroll (268)
	D	Light	Weak	W & MW-Seaton (274)
Loess five feet or more thick, calcareous at less than 42 in., some soils calcareous at surface. Chute is formed in wind-deposited fine sand.	B & D	Light	Moderate	W-Sylvan (19)
	D	Light	Weak	W-Timula (271)
	D	Light	Weak to None	Ex-Chute (282), S Ex & W-Hamburg (30)
Approx. 30 to 50 in. of loess over leached loam and sandy loam glacial till, sola more than 4 feet thick.	E	Dark	Moderate	W-Ogle (412, 574)
	E & F	Mod. Dark	Moderate	W-Myrtle (414)
	F	Light	Moderate	W-Flagg (419)
Approx. 15 to 30 in. of loess over leached loam and sandy loam glacial till, sola more than 4 feet thick.	E	Dark	Moderate	W & MW-Durand (416), P-Coatsburg (660)
	E & F	Mod. Dark	Moderate	W & MW-Argyle (227)
	F	Light	Moderate	W & MW-Pecatonica (21)
Loam glacial till, calcareous at less than 2 ft.	F	Light	Moderate	W-Strawn (224)
Thin silty or loamy sediments over gravel and sand, usually calcareous by 1 to 4 ft.	E & F	Dark	Weak to None	Ex-Rodman (93)
	E & F	Light	Moderate	S Ex & W-Casco (972)
	E & F	Light	Moderate	W-Fox (972)
Approx. 40 to 60 in. of loess over sand or loamy sand.	G	Dark	Weak	W-Port Byron, sandy substratum (562)
	H	Light	Weak	W-Seaton, sandy substratum (563)

(Footnotes given at end of table.)

TABLE 3 (cont.).

Parent material of soil profile	Soil assoc. area	Surface color	Degree of B horizon development	Natural drainage class[a] and soil series[b]
Approx. 20 to 40 in. of loess over sand or loamy sand.	G & J	Dark	Weak	W-Waukegan (564)
	H	Light	Weak	W-Tell (565, 952)
Approx. 40 to 60 in. of loess over bedrock, mainly limestone.	I	Dark	Moderate	W-Ashdale (411)
	I	Light	Moderate	W-Palsgrove (950, 951)
Approx. 40 to 60 in. of loess and glacial drift over limestone bedrock.	I	Dark	Moderate	W-Hitt (506)
	I	Light	Moderate	W-Woodbine (951)
Approx. 20 to 40 in. of loess over limestone bedrock.	I	Light	Moderate	W-Dubuque (950)
Less than 20 in. of loess over limestone bedrock.	I	Dark & Mod. Dark	Weak to None	W-Sogn (504)
	I	Light	Moderate	W-Dunbarton (505, 511)
Approx. 30 to 50 in. of loess over shale bedrock.	I	Dark	Moderate	W & MW-Keltner (546), SP-Loran (572)
	I	Light	Moderate	W & MW-Eleroy (949)
Less than 30 in. of loess over shale bedrock.	I	Light	Moderate	W & MW-Derinda (949)
Approx. 30 to 50 in. of loess over sandstone bedrock.	I	Light	Moderate	W-Gale (413)
Colluvial and water or wind deposited silts 40 to greater than 60 in. over stratified loamy and sandy sediments.	J	Dark	Weak	W & MW-Worthen (37), SP-Littleton (81), P-Drummer (152)
	J	Light	Weak	W & MW-Drury (75)
	J & K	Light	Moderate	W & MW-Camden (134)
Loess 0 to 24 in. over stratified reddish and gray silty clay loam to clay lacustrine sediments.	K	Dark	Weak	P-Niota (568)
	K	Mod. Dark to Dark	Moderate	P-Niota (261)
	K	Light	Weak	Va-Terrace Escarpments (577)
	K	Light	Moderate	P & SP-Zwingle (576)

TABLE 3 (cont.).

Parent material of soil profile	Soil assoc. area	Surface color	Degree of B horizon development	Natural drainage class[a] and soil series[b]
Dominantly sandy loam sediments over sand on terraces and uplands.	L	Dark	Mod. to Weak	W-Onarga, reddish subsoil variant (673)
	G & L	Dark	Weak	S Ex & W-Dickinson (87), SP-Hoopeston (172, 237), P-Gilford (201), Selma (125)
	H & L	Light	Weak	W-Lamont (175, 952)
Dominantly loamy sand and sand sediments mainly on terraces.	L	Dark	Weak	S Ex-Ade (98)
	L	Light	Weak	S Ex & W-Bloomfield (53)
	L	Dark	Very Weak	Ex-Sparta (88)
	L	Light	Very Weak	Ex-Plainfield (54)
	L	Light	None	Ex-Blown-Out Land (63)
Deep silty, slightly acid to neutral alluvium on stream flood plains.[c]	M	Dark	None	W & MW-Huntsville (77), SP-Lawson (451), P-Otter (76)
	M	Light	None	SP-Wakeland (333), Orion (415)[d]
Deep silty or loamy, calcareous alluvium on stream floodplains.[c]	M	Dark	None	P-Millington (82)
	M	Dark & Mod. Dark	None	MW & SP-Dorchester (239, 578)
Silty clay loam, neutral alluvium on stream flood plains.[c]	M	Dark	None	P-Sawmill (107)
Deep deposits of organic matter, usually containing snail shells.	M	Dark	None	VP-Lena (210)
Approx. 16 to 50 in. of neutral organic matter over loamy mineral matter.	M	Dark	None	VP-Palms (100)

[a] Natural drainage classes are abbreviated as follows: Ex = Excessive, S Ex = Somewhat Excessive, W = Well, MW = Moderately Well, SP = Somewhat Poor, P = Poor, VP = Very Poor, Va = Variable.

[b] Also includes three land classes (63, 455, and 577), five variants (511, 568, 574, 578, and 673), and two phases (562 and 563).

[c] Mixed Alluvial Land (455) may have any of the alluvial parent materials designated by (c) and is variable in color and natural drainage.

[d] Orion (415) has buried dark-colored alluvium at 20 to 40 inch depths.

Argyle Series (227)

The Argyle series consists of deep, moderately dark-colored soils that are well and moderately well drained. These are gently sloping to very strongly sloping upland soils located primarily in the eastern and southwestern part of the county. They have formed partly in silty loess but mostly in the underlying loamy glacial drift under a mixed grassland and forest vegetation. These soils are used primarily for corn, oats, and hay.

The Argyle soils occur mainly with Pecatonica and Myrtle soils. Argyle and Pecatonica soils occupy similar landscape positions and are derived from the same parent materials, but Argyle soils have been influenced by grass vegetation. In most places Argyle soils occupy the more sloping areas adjacent to the Myrtle soils, which are developed in thicker loess over drift.

The Argyle soils have moderate permeability and a high available water capacity.

In mapping, a few areas are included which may have as much as 3 feet of loess.

The five mapping units occurring in Carroll County are 227B, 227C, 227C2, 227D2, and 227E2.

Argyle silt loam representative profile (227C):

A1 (0-7″) Black (10YR 2/1) silt loam; moderate, fine and medium, crumb structure; friable; many roots; medium acid; clear, smooth boundary.

A2 (7-12″) Dark grayish-brown (10YR 4/2) silt loam; weak, medium, platy structure breaks to fine and medium, crumb structure; many roots; light gray (10YR 7/1) silt coatings on peds; medium acid; clear, smooth boundary.

B1 (12-17″) Yellowish-brown (10YR 5/4) light silty clay loam; moderate, fine and medium, subangular blocky structure; firm; common roots; very dark gray (10YR 3/1) worm channels; light gray (10YR 7/1) silt coatings on peds; medium acid; clear, smooth boundary.

B21t (17-24″) Yellowish-brown (10YR 5/4) silty clay loam; strong, fine and medium, subangular blocky structure; firm; common roots; thin, discontinuous, dark brown (7.5YR 4/2) clay films; strongly acid; abrupt, smooth boundary.

IIB22t (24-42″) Red (2.5YR 4/6) gravelly clay loam; moderate, medium and coarse, angular blocky structure; firm; few roots; thin, continuous, yellowish-red (5YR 4/6) clay films, especially on pebbles; common, fine, black (N 2/0) iron-manganese or organic coatings; stone line in upper part of horizon; strongly acid; clear, smooth boundary.

IIB23t (42-70″) Red (2.5YR 4/6) gravelly sandy clay loam; moderate, coarse, angular blocky structure; firm; few roots; thin, discontinuous, dark reddish-brown (2.5YR 3/4) clay films; strongly acid; clear, smooth boundary.

IIB3 (70-84″) Dark red (2.5YR 3/6) sandy loam; weak, coarse, angular blocky structure; friable; few pebbles; slightly acid. Becomes calcareous sand and gravel at 90 inches with strong effervescence.

Ashdale Series (411)

This series consists of dark-colored, well-drained soils that are deep to limestone bedrock. Bedrock normally occurs at depths between 40 and 60 inches. These soils occupy gently sloping to very strongly sloping upland positions, mainly in the eastern half of the county. Ashdale soils have formed mostly from silty loess material and partly from underlying limestone bedrock under grassland vegetation. Most Ashdale soils are used to grow corn, oats, and hay.

Ashdale soils are predominantly geographically associated with Tama, Hitt, and Palsgrove soils. Ashdale soils occupy side slopes below the deep, silty, more level, ridgetop Tama soils. The Ashdale soils lie on the same kind of landscape positions as the Hitt soils. The Ashdale soils formed mostly in loess, but Hitt soils are formed largely from glacial drift. Ashdale soils, in some places, occupy landscapes adjacent to the lighter colored Palsgrove soils.

Ashdale soils have moderate permeability and high to moderate available water capacity. The most favorable rooting zone is in that portion of the profile above the bedrock. Because bedrock occurs between 40 and 60 inches, unfiltered sewage from septic tanks can travel along cracks and crevices and contaminate water supplies. Ashdale soils are limited for ponds because water is lost as it seeps along fractures of the underlying bedrock. This soil could be used as a source for agricultural limestone or road rock.

Because of low total acreage, some soil areas are included with Ashdale that have limestone bedrock at less than 40 inches.

The mapping units of this soil series are 411B, 411C2, 411D2, and 411E3.

Ashdale silt loam representative profile (411C2):

Ap (0-8″) Very dark grayish-brown (10YR 3/2) silt loam; moderate, medium, granular structure; friable; many roots; neutral; abrupt, smooth boundary.

B1t (8-11″) Dark brown (10YR 3/3) light silty clay loam; weak to moderate, fine, subangular blocky structure; firm; many roots; slightly acid; clear, smooth boundary.

B21t (11-17″) Brown to dark brown (10YR 4/3) silty clay loam; moderate, fine, subangular blocky structure; firm; common roots; medium acid; clear, smooth boundary.

B22t (17-29″) Dark yellowish-brown (10YR 4/4) silty clay loam; moderate, fine to medium, subangular blocky structure; firm; few roots; continuous, dark brown (10YR 4/3) clay films; pale brown (10YR 6/3) silt coatings when dry; medium acid; clear, smooth boundary.

B23t (29-36″) Dark yellowish-brown (10YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; firm; few roots; discontinuous, dark brown (10YR 4/3) clay films; very pale brown (10YR 7/3) silt coatings when dry; medium acid; clear, smooth boundary.

B31t (36-42″) Dark yellowish-brown and yellowish-brown (10YR 4/4 and 5/4) light silty clay loam; weak, medium, subangular blocky structure; firm; patchy, dark brown (10YR 4/3) clay films; very pale brown (10YR 7/3) silt coatings when dry; medium acid; few chert fragments present; abrupt, smooth boundary.

IIB32t (42-49″) Reddish-brown (5YR 4/4) clay; weak, medium to coarse, subangular and angular blocky structure; very firm; thin reddish-brown (5YR 4/3) clay films; slightly acid; few chert fragments present; abrupt, smooth boundary.

R (49-60″ +) Yellow (10YR 7/6 and 7/8) limestone bedrock, decomposed in upper few inches; moderately alkaline; strong effervescence.

Atterberry Series (61)

The Atterberry series consists of deep, moderately dark-colored soils that are somewhat poorly drained. These soils occupy nearly level to gently sloping upland areas and terrace benches or footslope positions. Atterberry soils have formed in more than 5 feet of loess under mixed grass and forest vegetation. These soils are suited to all crops commonly grown in the county.

The Atterberry soils are geographically associated with the Downs, Tama, and Muscatine soils. In most places, the Atterberry soils occupy the more level landscapes adjacent to the better drained and more sloping Downs and Tama soils. Atterberry soils occupy nearly level to gently sloping landscapes similar to the darker colored Muscatine soils. They also occur with Rozetta and Fayette soils, which have better natural drainage and lighter colored surface horizons.

These soils are moderately permeable and have very high available water capacity. They are limited for septic tank filter fields and basements because they have a seasonally high water table.

Some areas occurring on low terrace positions in the western part of Carroll County have silt loam textured B2 horizons, which are lower in clay content than normal. Included in mapping are a few areas where loess is less than 5 feet thick.

The two mapping units shown on the soil maps are 61A and 61B.

Atterberry silt loam representative profile (61A):

Ap (0-9″) Very dark brown (10YR 2/2) silt loam; weak, fine to medium, crumb structure; friable; mildly alkaline; abrupt, smooth boundary.

A21 (9-16″) Dark grayish-brown (10YR 4/2) silt loam; few, fine, distinct, dark brown (7.5YR 4/4) mottles; moderate, medium to coarse, crumb to weak, granular structure; friable; slightly acid; clear, smooth boundary.

A22 (16-20″) Brown (10YR 5/3) silt loam; common, fine, distinct, brownish-yellow (10YR 6/6) mottles; weak to moderate, fine to medium, platy structure; friable; strongly acid; many iron-manganese concretions; clear, smooth boundary.

B1tg (20-29″) Grayish-brown (10YR 5/2) heavy silt loam; common, fine, distinct, strong brown (7.5YR 5/6) mottles; moderate, fine to medium, subangular blocky structure; friable; dark brown (10YR 4/3) clay films; strongly acid; many iron-manganese concretions; clear, smooth boundary.

B21tg (29-37″) Grayish-brown (10YR 5/2) light silty clay loam; common, medium, prominent, yellowish-red (5YR 4/8) mottles; moderate, coarse, angular blocky structure; friable; dark brown (10YR 4/3) clay films; strongly acid; many iron-manganese concretions; clear, smooth boundary.

B22tg (37-44″) Grayish-brown (10YR 5/2) silty clay loam; common, medium, prominent, yellowish-red (5YR 4/8) mottles; moderate, coarse, angular and subangular blocky structure; friable; dark brown (10YR 4/3) clay films; medium acid; few iron-manganese concretions; clear, smooth boundary.

B3g (44-52″) Grayish-brown (10YR 5/2) silt loam; common, medium, distinct, strong brown (7.5YR 5/8) and few, medium, prominent, reddish-brown (5YR 4/4) mottles; moderate to weak, coarse, angular blocky structure; friable; slightly acid; gradual, smooth boundary.

Cg (52-60″) Mixed light brownish-gray (10YR 6/2) and grayish-brown (10YR 5/2) silt loam; many, medium, distinct, yellowish-brown (10YR 5/8) and strong brown (7.5YR 5/8) mottles; massive; friable; neutral.

Bloomfield Series (53)

The Bloomfield series consists of deep, light-colored, sandy soils that are well drained to somewhat excessively drained. These soils occupy gently sloping to steep slopes on terrace benches and upland dunes in the southwestern and extreme northwestern part of the county. Bloomfield soils have formed in sandy material, which was deposited by water and reworked by wind, under a forest vegetation. In Carroll County Bloomfield soils are used mostly for permanent pasture and woodland, but corn, oats, and hay are grown in some places.

Bloomfield soils are geographically associated with Plainfield and Lamont soils. In most places these soils lie adjacent to each other on dunes and slopes in an unpredictable pattern. Bloomfield soils have clay-iron bands or lamellae above depths of 60 inches. The Plainfield soils lack these bands. Bloomfield soils have more sand in their surfaces and subsoils than Lamont soils.

Bloomfield soils are rapidly to moderately rapidly permeable and have low available water capacity. Septic tank filter fields are limited in Bloomfield soils because effluent moves through the soil and can contaminate water supplies. In some places Bloomfield soils are important as a source of sand for building and road construction. Because this soil has naturally loose consistence, power implement traction is difficult.

The mapping units shown on the soil map are 53B, 53D, and 53F. Because slope in areas of these soils is of minor significance, some areas included in mapping units are outside the slope range indicated.

Bloomfield fine sand representative profile (53D):

Ap (0-6″) Dark brown to brown (10YR 4/3) fine sand; weak, fine, granular structure or single grained; very friable to loose; common roots; medium acid; abrupt, smooth boundary.

A2 or A3 (6-22″) Yellowish-brown (10YR 5/4) fine sand; weak, medium, subangular blocky structure or single grained; very friable to loose; common roots; medium acid; clear, smooth boundary.

B1 (22-36″) Yellowish-brown to dark yellowish-brown (10YR 5/6 to 4/6) fine sand; single grained; loose; common roots; medium acid; clear, smooth boundary.

A + Bt (36-55″) Yellowish-brown (10YR 5/4) fine sand; single grained; loose (A horizon non-band material); dark brown (7.5YR 4/4) loamy sand or sandy loam; weak, medium,

subangular blocky structure to single grained; friable (Bt clay-iron lamellae or bands); few roots; medium acid; gradual, wavy to irregular boundary. Bt lamellae average ⅛ to 1 inch in thickness and occur 2 to 3 inches apart.

C (55-80″ +) Yellowish-brown to dark yellowish-brown (10YR 5/4 to 4/4) fine sand; single grained; loose; medium to slightly acid.

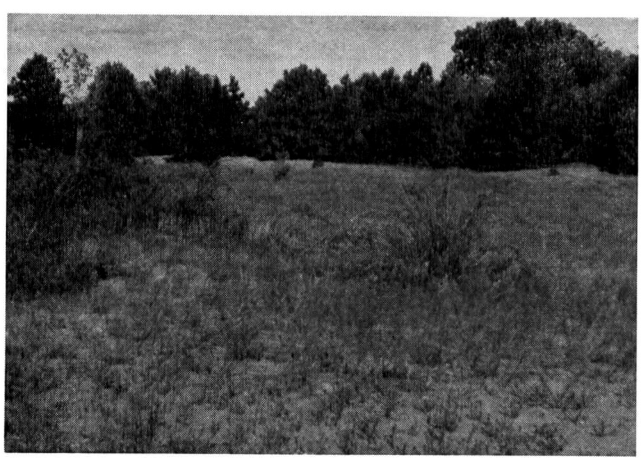
Blown-Out Land (63)

The areas that are mapped as Blown-Out Land make up a land type which was formed mainly by severe wind erosion of very sandy soils. This land type occurs on moderately sloping to very steep areas in the southwestern part of the county, primarily on the sandy terraces but also in the upland. The areas consist of deep, light-colored sand which has been water or wind deposited. In some places the sand is coarse and contains some gravel. These areas are usually idle. Many areas are void of vegetation and vegetation is difficult to establish. Drainage is somewhat excessive to excessive.

Sparta is the dominant associated series among the sandy soils that occur with this land type. The blown-out areas are composed of C horizon material of the associated soils. Although most areas have resulted from wind erosion, the area located in Section 14, T23N, R4E is mainly the result of water erosion and gulley formation in an area where a thin loess cover was present over sand.

This land type has rapid permeability and low to very low available water capacity. Septic tanks are limited on this land because effluent can move rapidly through the sand material and contaminate water supplies. Some areas can serve as a source of sand for construction materials. Traction of power implements is poor because of the loose consistence of the sand deposits.

The mapping unit indicating areas of this land type is 63. The soil profiles have been removed in Blown-Out Land areas; no representative profile can be given.



Blown-Out Land in the sandy terrace area northeast of Thomson in western Carroll County. (Fig. 12)

Camden Series (134)

This series consists of deep, light-colored soils that are well and moderately well drained. Camden soils occupy nearly level to very strongly sloping areas on stream terraces and uplands. Camden soils are located mainly in the western one-third of the county and are not very extensive. They have formed partly in silty material and partly in loamy deposits under forest vegetation. Camden soils are primarily used for growing corn, oats, and hay.

Camden soils are commonly associated with Fayette and Drury soils and the Terrace Escarpments land type. Camden soils are developed partly in silty material and partly in outwash, but Fayette and Drury soils are developed entirely in silty material. Terrace Escarpments tend to lie on steeper slopes and have lacustrine clays in part of the profile.

Camden soils have moderate permeability and high available water capacity.

A few areas included with Camden have slopes that exceed 18 percent, and a few gently to moderately sloping areas have darker surface horizons than is typical for the series.

The mapping units for the Camden series are 134A, 134B, 134C, 134C2, 134D2, and 134E2.

Camden silt loam representative profile (134C):

Ap (0-9″) Dark grayish-brown (10YR 4/2) silt loam; weak, medium, granular structure; friable; medium acid; abrupt, smooth boundary.

B1t (9-15″) Brown and dark brown (7.5YR 4/4) light silty clay loam; weak, fine, subangular blocky structure; friable; slightly acid; clear, smooth boundary.

B21t (15-21″) Brown and dark brown (7.5YR 4/4) silty clay loam; moderate, fine, subangular blocky structure; firm; brown and dark brown (7.5YR 4/2) discontinuous clay coats over all ped surfaces; slightly acid; clear, smooth boundary.

B22t (21-31″) Brown and dark brown (7.5YR 4/4) silty clay loam; moderate to strong, medium, subangular blocky structure; firm; brown and dark brown (7.5YR 4/2) continuous clay coats on all ped surfaces; medium acid, clear, smooth boundary; few sand grains noticeable.

IIB3t (31-44″) Brown (7.5YR 5/4) light silty clay loam to clay loam; weak to moderate, medium, subangular blocky structure; friable to firm; brown (7.5YR 5/3) discontinuous clay coats over all ped surfaces; light gray (10YR-7/1) silt coats; medium acid; clear, smooth boundary.

IIC (44-60″ +) Stratified brown and strong brown (7.5 YR 5/4 and 5/6) sandy loam and loam, brown and light brown (7.5YR 5/4 and 6/4) loamy sand, with two very thin bands (2 inches) of dark reddish-brown and reddish-brown (2.5YR 3/4 and 4/4) silty clay; massive to nearly single grained in the more sandy portions; very friable in loamy sand and firm in silty clay; slightly acid in the upper 6 inches, neutral below.

Casco Series (972 or X With Fox)

The Casco series is made up of light-colored, well-drained to somewhat excessively drained soils that are shallow to underlying calcareous gravel and sand.

These soils occur on strongly to very strongly sloping sites where water has deposited calcareous sand and gravel in knobs and short ridges. They have developed mainly under forest vegetation and occupy a very small acreage in the southern half of the county, mainly in upland positions. Most areas are used for pasture or remain forested. Few areas are cultivated.

The Casco soils are geographically associated with Rodman and Fox soils. In most places, Rodman soils lie adjacent to Casco soils and occupy similar slopes. Rodman soils are often calcareous at the surface and are more shallow to underlying gravelly material than Casco soils. Fox soils tend to occupy less sloping portions of the landscape than Casco soils and are deeper to underlying gravelly material than Casco soils. Because of great variation in depth to sand and gravel over short distances, Casco and Fox soils are mapped together as a soil complex.

These soils have moderate permeability and low available water capacity. The most favorable rooting zone extends to a depth of about 1 to 2 feet. Below this depth are calcareous sand and gravel that are very low in water-holding capacity and high in natural lime. Because Casco soils have very permeable underlying gravel, unfiltered sewage from septic tanks can contaminate water supplies. The overburden in areas of Casco soils is thin, and the underlying material can be a source of gravel and sand.

Some areas are included in mapping that are darker colored on the surface and have a less well-developed B2 horizon than is described here.

The mapping units containing combinations of Casco and Fox soils are 972D2 or XD2, 972E2 or XE2, and 972E3 or XE3.

Casco silt loam representative profile (972D2):

Ap (0-6") Dark grayish-brown and very dark grayish-brown (10YR 4/2 and 3/2) silt loam; moderate, fine to medium, granular structure; friable; many roots; slightly acid; abrupt, smooth boundary.

B2t (6-15") Brown (7.5YR 4/4) light silty clay loam to clay loam; moderate, medium, subangular blocky structure; firm; many roots; dark brown (7.5YR 3/4) clay films; neutral; clear, wavy boundary.

IIC (15-60"+) Light yellowish-brown and yellow (10 YR 6/4 and 7/6) gravel, sand, and few cobbles from limestone with some igneous gravel; single grained; loose; few roots; moderately alkaline; violent effervescence.

Chute Series (282)

This series consists of sandy, light-colored, deep soils that are excessively drained. These soils occupy very strongly sloping to steep upland areas, often dune-like, near or in the bluffs east of the Mississippi River flood plain and terraces. Chute soils are weakly developed in calcareous sandy deposits which have been wind deposited. They are inextensive and have developed primarily under forest vegetation, occasionally including red cedar. In some places, Chute soils are cultivated, but most areas are used as pastureland or support trees.

Chute soils occur as ridges or dunes with Seaton and Timula soils. Seaton and Timula soils are developed in loess and do not have carbonates as shallow as Chute soils.

Hamburg soils are similar to Chute soils but are more silty. In Carroll County they occur in the same general area, but Hamburg soils are more extensive and occur on or very close to the bluff face, while Chute soils tend to occur short distances from the bluff face.

Chute soils are rapidly permeable and have low available water capacity.

The mapping units for this series are 282E3 and 282F3. Some moderately eroded areas are included in mapping units, and the representative profile described here is only moderately eroded.

Chute fine sand representative profile (282E3):

A1 (0-4") Dark brown (10YR 4/3) fine sand; weak, fine, crumb structure; friable; many roots; neutral; abrupt, smooth boundary.

AC (4-10") Brown (10YR 5/3) fine sand; single grained; loose; few roots; neutral; clear, smooth boundary.

C (10-60" +) Pale brown (10YR 6/3) fine sand; single grained; loose; slight effervescence; mildly alkaline.

Coatsburg Series (660)

This series consists of dark-colored, poorly drained, deep soils. These soils lie on strongly sloping and very strongly sloping uplands in small, scattered areas in the eastern part of the county. Coatsburg soils have formed partly in silty material (probably loess) usually 10 to 20 inches thick, but primarily in fine-textured or clayey drift under grass vegetation. They are primarily used for growing corn, oats, hay, and pasture.

Coatsburg soils are predominantly geographically associated with the Tama and Lawson soils. In most places Coatsburg soils occupy slopes between the less sloping and better drained, upland Tama soils and the nearly level, bottomland Lawson soils. Coatsburg soils are formed partly in silty material but mostly in clayey drift. Tama soils are formed entirely in silty material. Lawson soils are formed in silty, waterlaid sediments.

Coatsburg soils have slow to very slow permeability and moderate available water capacity. The most favorable rooting zone is in the upper 1 to 3 feet; below this depth the high clay content of the subsoil tends to limit root growth. These soils are limited for septic tank filter fields because they are slowly to very slowly permeable. In some places septic tank effluent will seep out at the surface on lower slopes. Because of the high clay content of the subsoil, Coatsburg soils have low bearing strength and a high shrink-swell ratio.

Included in mapping are a few forested areas that have lighter colored surface soils than described here. Also included are some areas where the loess cover may be as thick as 3 feet and where the natural drainage is somewhat poor, rather than poor.

The mapping units shown on the soil map are 660D2, 660D3, 660E2, and 660E3. The profile described here has a thicker A horizon than is normal for the mapping unit.

Coatsburg silt loam representative profile (660D2):

A1 (0-9") Black to very dark gray (10YR 2/1 to 3/1) silt loam; moderate, medium to coarse, granular structure; friable; many roots; neutral; gradual, smooth boundary.

A3 (9-15") Very dark gray (10YR 3/1) with zones and channel fillings of black (10YR 2/1) silt loam; moderate, fine to medium, subangular blocky structure; friable; many roots; light gray (10YR 6/1) silt coatings when dry; slightly acid; clear, smooth boundary.

IIB1t (15-24") Dark grayish-brown and dark gray (10 YR 4/2 and 4/1) heavy silty clay loam to silty clay with occasional fine gravel; moderate to strong, fine and medium, subangular blocky structure; firm; common roots; nearly continuous, very dark grayish-brown (10YR 3/2) clay films; few light gray (10YR 6/1) silt coatings when dry; slightly acid; clear, smooth boundary.

IIB21tg (24-36") Gray (10YR 5/1) light silty clay with occasional fine gravel and few, fine, prominent, dark brown (7.5YR 4/4) and yellowish-red (5YR 4/8) mottles; moderate to strong, fine and medium, subangular blocky structure; very firm; common roots; nearly continuous, dark gray (10YR 4/1) clay coatings; strongly acid; clear, smooth boundary.

IIB22tg (36-52") Grayish-brown (2.5Y 5/2) heavy silty clay loam to clay loam with occasional fine gravel and common, coarse, prominent, strong brown (7.5YR 5/6) and yellowish-red (5YR 4/8) mottles; moderate, medium to coarse, subangular and angular blocky structure; firm; few roots; discontinuous, dark gray (10YR 4/1) clay films; strongly acid; gradual, smooth boundary.

IIB3tg (52-64") Grayish-brown and dark grayish-brown (2.5Y 5/2 and 4/2) heavy loam with occasional pebbles; common, medium, prominent, yellowish-red (5YR 4/8) and yellowish-brown (10YR 5/6) mottles; weak, medium to coarse, angular blocky structure; friable; few roots; few clay films in upper part; medium acid. Till-like loam material with carbonates at 74 inches.

Derinda Series (949 With Eleroy)

The Derinda series is made up of moderately well-drained and well-drained soils that are light colored, having developed under forest vegetation from loess and shale bedrock. Loess thickness is normally 15 to 30 inches, and relatively unweathered shale bedrock is encountered at less than 40 inches. These soils are considered moderately deep. They occur on moderately sloping to steep upland sites, which are mainly in the extreme northern part of the county, in a few areas near Wacker, and in the upland areas south and east of Argo. Some areas are used for pasture and woodland and some are used for cultivated crops.

Derinda soils are mapped only with the Eleroy soils in an undifferentiated unit. The Eleroy soils are developed in thicker loess, 30 to 50 inches, and shale bedrock occurs at depths between 40 and 60 inches. The Derinda soils are of greatest extent in the steeper sloping mapping units.

Derinda and Eleroy soils are most commonly associated with Dunbarton, Dubuque, and Palsgrove soils, which have limestone bedrock at less than 60 inches. Fayette and Seaton soils, which are developed entirely in loess, often occur on ridgetops adjacent to the sloping Derinda and Eleroy soils.

Derinda soils have slow permeability and low to moderate available water capacity because of the relatively shallow depth to the shale bedrock, which has a high clay and carbonate content. Good root penetration is limited to the part of the profile above the shale. Use of septic tank filter fields is limited because of the slow permeability and the seepage of effluent that may occur on slopes. The high clay content of the shale causes considerable shrinking and swelling as moisture content varies.

In some mapping units a few inches of glacial drift is included in the sola of these soils.

The mapping units containing combinations of the Derinda and Eleroy soils are 949C2, 949D2, 949D3, 949E2, 949E3, and 949F2.

Derinda silt loam representative profile (949F2):

Ap (0-6") Dark grayish-brown (10YR 4/2) silt loam; moderate, medium, granular structure; friable; slightly acid; abrupt, smooth boundary.

B21t (6-15") Dark yellowish-brown and yellowish-brown (10YR 4/4 and 5/4) silty clay loam; moderate, medium, subangular blocky structure; firm; few dark brown (10YR 4/3) clay films; some light gray (10YR 7/2) silt coatings when dry; slightly acid; clear, smooth boundary.

IIB22t (15-21") Mixed brown (10YR 4/3) and grayish-brown (2.5Y 5/2) heavy silty clay loam; few, fine, distinct, yellowish-brown (10YR 5/8) mottles; moderate, medium, subangular and angular blocky structure; firm; thin dark grayish-brown (10YR 4/2) clay films; neutral; clear, smooth boundary.

IIC (21-60" +) Greenish-gray (5GY 6/1) and olive (5Y 5/3) clay shale, interbedded with brownish-yellow (10YR 6/6) limestone lenses and fragments; massive; very firm; moderately alkaline; strong effervescence.

Dickinson Series (87)

The Dickinson series consists of dark-colored, well-drained to somewhat excessively drained soils that are deep to underlying loose sand. These soils occupy nearly level to very strongly sloping terrace benches and uplands in the southwestern part of Carroll County and in the terrace area in the extreme northwestern part. Dickinson soils have formed in sandy material under native prairie vegetation. These sandy materials are water deposited and have been reworked by wind in many places. In Carroll County, Dickinson soils are used for growing corn, oats, and hay.

Dickinson soils are geographically associated with the Ade, Sparta, and Waukegan soils. In most places

Dickinson soils occupy nearly level to very strongly sloping areas similar to Ade and Sparta soils, but Dickinson soils have more fine sand and silt in the surface and subsoil. Dickinson and Waukegan soils, in most places, occupy similar slopes, but Waukegan soils are formed from 20 to 40 inches of silty loess over sand.

Dickinson soils have moderately rapid to rapid permeability and low available water capacity. Because these soils are very permeable, unfiltered sewage from septic tanks can contaminate water supplies. Dickinson soils are a good source of sand.

In some nearly level to gently sloping areas, dark-colored surface horizons exceed a thickness of 2 feet. A few areas with a thin loess cover, giving silt loam A horizons, are included with this series.

The mapping units occurring in Carroll County are 87A, 87B, 87C, 87C2, and 87E2.

Dickinson sandy loam representative profile (87A):

A11 (0-15") Very dark brown (10YR 2/2) sandy loam; weak, medium, granular structure; very friable; slightly acid; clear, smooth boundary.

A12 (15-23") Very dark brown and dark brown (10YR 2/2 and 3/3) sandy loam; weak, medium and coarse, granular structure; very friable; slightly acid; clear, smooth boundary.

B21 (23-29") Dark brown (10YR 4/3) sandy loam; weak, fine, subangular blocky structure; very friable; medium acid; clear, smooth boundary.

B22 (29-38") Dark yellowish-brown and yellowish-brown (10YR 4/4 and 5/4) sandy loam; weak, fine and medium, subangular blocky structure; very friable; medium acid; gradual, smooth boundary.

C1 (38-60") Yellowish-brown (10YR 5/4) loamy sand or sand; single grained; loose; with two thin clay-iron bands of dark brown (7.5YR 4/4) with some pale brown (10YR 6/3) sandy loam; weak, medium, subangular blocky structure to single grained; very friable; medium to slightly acid; gradual, smooth boundary.

C2 (60-70" +) Pale brown to very pale brown (10YR 6/3 to 7/3) sand; single grained; loose; slightly acid.

Dorchester Series (239)

The Dorchester series consists of deep, moderately dark-colored and dark-colored soils that are moderately well drained. These soils occupy depressional to gently sloping bottomlands that have received calcareous sediments from limestone bedrock slopes in the upland. Dorchester is the major bottomland soil along Plum River, Camp Creek, and the lower parts of Johnson and Carroll Creeks. These soils are formed in recently deposited silty alluvium from adjacent upland and terrace slopes. Sediments are derived from areas developed under forest or grass vegetation. They are used mostly for corn.

Dorchester soils are geographically associated with Lawson and Sawmill soils. Dorchester soils contain carbonates and have a lighter color than Lawson and Sawmill soils. The silt loam Dorchester and Lawson soils often occupy extensive nearly level areas adjacent to the silty clay loam Sawmill soils, which occur at lower levels or in depressions.

Dorchester soils have moderate permeability and very high available water capacity. They are naturally high in lime, causing the availability of phosphorus to be reduced. Dorchester soils, in some places, are limited for septic tank filter fields and basements because their landscape positions have a seasonally high water table.

Included with Dorchester in Carroll County are many areas which are somewhat poorly drained. The wet mapping unit is more poorly drained than is normal for the series.

The mapping units of the Dorchester series are 239A, 239A, and 239B.

Dorchester silt loam representative profile (239A):

C1 (0-6") Very dark grayish-brown (10YR 3/2) silt loam; moderate, medium, crumb structure; friable; many roots; moderately alkaline; slight effervescence; clear, smooth boundary.

C2 (6-18") Stratified very dark grayish-brown and dark grayish-brown (10YR 3/2 and 4/2) silt loam; moderate, very thin, platy structure; friable; many roots; moderately alkaline; slight effervescence; clear, smooth boundary.

C3 (18-56") Stratified grayish-brown, dark grayish-brown, and very dark grayish-brown (10YR 5/2, 4/2, and 3/2) silt loam; weak, very thin, platy structure; friable; common roots; few, fine, distinct, dark reddish-brown (5YR 3/4) mottles in lower part of horizon; moderately alkaline; slight effervescence; abrupt, smooth boundary.

IIAb (56-65" +) Mixed black and very dark brown (10YR 2/1 and 2/2) silt loam; massive; friable; contains occasional snail shells; moderately alkaline; strong effervescence.

Dorchester, Cobbly Subsoil Variant (578)

This variant of the Dorchester series consists of moderately deep and deep, moderately dark-colored and dark-colored soils that are moderately well drained. These soils differ from the Dorchester series in having cobblestones and flagstones of chert and dolomite at depths between 2 and 4 feet. In some places solid bedrock occurs at these depths instead of cobbly material. Dorchester, cobbly subsoil variant soils occur in flood plains, mainly in the upper ends of tributaries to Plum River and in the gorge along Carroll Creek between Mt. Carroll and the junction with Plum River.

These soils occur on level to nearly level flood plains where coarse-textured alluvium derived from outcropping bedrock on slopes has been covered with recent silty sediments. Sediments are derived from upland areas developed under forest or grass vegetation. Some areas are cultivated and others are maintained as permanent pasture.

Dorchester, cobbly subsoil variant soils occur mainly with deeper Dorchester soils but also with Orion and Lawson soils. They have moderate permeability and

moderate to high available water capacity, depending on depth to the underlying cobbly material. These soils contain carbonates or lime material.

As mapped in Carroll County, the surface color varies considerably from light to dark, some areas are somewhat poorly drained, and some areas not containing carbonates on the surface have been included.

The only mapping unit shown on the soil map is 578.

Dorchester silt loam, cobbly subsoil variant representative profile (578):

C1 (0-8") Stratified very dark gray and grayish-brown (10YR 3/1 and 5/2) silt loam; moderate, very thin to thin, platy structure; friable; many roots; moderately alkaline; slight effervescence; clear, smooth boundary.

C2 (8-30") Stratified dark grayish-brown, very dark grayish-brown, and very dark gray (10YR 4/2, 3/2, and 3/1) silt loam; common, fine, distinct, brown (7.5YR 4/4) and common, coarse, distinct, dark reddish-brown (5YR 3/4) mottles; moderate, very thin to thin, platy structure; friable; many roots; few iron-manganese stains of very dark brown (10YR 2/2); moderately alkaline; slight effervescence; abrupt, wavy boundary. Contains occasional pebble bands about one inch thick.

IIC3 (30" +) Primarily chert and limestone fragments as angular cobblestones and flagstones with some pebbles.

Downs Series (386)

The Downs series consists of deep, moderately dark-colored, moderately well-drained to well-drained soils developed in thick loess in areas transitional between grass and forest vegetation. These soils occupy nearly level to very strongly sloping areas on uplands but also occur on loess-covered terrace or bench positions.

Downs soils have very high available water capacity and moderate permeability. They are well suited to the crops commonly grown in the county, and most areas are being cultivated.

Typical landscape of Downs soils northeast of Mt. Carroll. Downs soils occur on the ridgetops, and both Downs and Fayette soils occur on the side slopes.
(Fig. 13)

These soils occur with Tama, Fayette, Rozetta, and Atterberry soils. In most places Downs soils occur between Tama soils, which formed under grass vegetation, and Fayette soils, which formed under a forest cover. Downs soils have better natural drainage and tend to occur on more sloping areas than the somewhat poorly drained Atterberry soils.

The eight mapping units shown on the soil map are 386A, 386B, 386C, 386C2, 386D, 386D2, 386E, and 386E2.

Downs silt loam representative profile (386B):

A1 (0-6") Very dark grayish-brown (10YR 3/2) silt loam; moderate, medium, granular structure; friable; slightly acid; clear, smooth boundary.

A21 (6-10") Very dark grayish-brown (10YR 3/2) and dark grayish-brown (10YR 4/2) silt loam; weak, thin, platy structure; friable; strongly acid; clear, smooth boundary.

A22 (10-14") Dark grayish-brown (10YR 4/2) silt loam; weak, medium, platy to weak, fine, subangular blocky structure; friable; very strongly acid; clear, smooth boundary.

B1 (14-16") Dark brown to brown (10YR 4/3) light silty clay loam; weak, fine, subangular blocky structure; friable; gray (10YR 6/1) silt coatings when dry; strongly acid; clear, smooth boundary.

B21t (16-32") Dark yellowish-brown (10YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; friable; dark brown (10YR 4/3) clay films; gray (10YR 6/1) silt coatings when dry; medium acid; clear, smooth boundary.

B22t (32-45") Yellowish-brown (10YR 5/4 and 5/6) silty clay loam; few, fine, faint, pale brown (10YR 6/3) mottles; light gray (10YR 7/1) silt coatings when dry; medium acid; clear, smooth boundary.

B3t (45-54") Yellowish-brown (10YR 5/4) light silty clay loam; common, medium, faint, pale brown (10YR 6/3) mottles; weak, coarse, subangular blocky structure; friable; few dark yellowish-brown (10YR 4/4) clay films; light gray (10YR 7/1) silt coatings when dry; few iron-manganese concretions; medium acid; gradual, smooth boundary.

C (54-60" +) Brown (10YR 4/3 and 5/3) silt loam; common, medium, faint, pale brown (10YR 6/3) and strong brown (7.5YR 5/6) mottles; weak, coarse, angular blocky structure; friable; few iron-manganese concretions; medium acid.

Drummer Series (152)

This series consists of deep, dark-colored soils that are poorly drained. These soils occupy nearly level areas, depressions, and narrow drainageways mainly on terrace positions near Argo, east of Johnson Creek. Drummer soils have formed mostly in silty material but partly in underlying loamy material under native water-tolerant grasses. Drummer soils are used mainly for growing corn.

Drummer soils are predominantly geographically associated with the Littleton and Worthen soils in Carroll County. Commonly, the poorly drained silty clay loam Drummer soils lie in depressions or in drainageways adjacent to the somewhat poorly drained silt loam Littleton or the moderately well-drained and well-drained silt loam Worthen soils.

Drummer soils are moderately permeable and have very high available water capacity. They are limited for septic tank filter fields and basements because they have a seasonally high water table.

A few small areas are included which have a few inches of light-colored soil material washed in and covering the original dark surface.

Because this soil occurs only on nearly level to depressional areas and is not subject to erosion, the only mapping unit is 152.

Drummer silty clay loam representative profile (152):

Ap (0-7″) Black (10YR 2/1) silty clay loam; massive to weak, medium and coarse, angular blocky structure; firm; neutral; abrupt, smooth boundary.

A12 (7-15″) Black (10YR 2/1) silty clay loam; moderate, coarse, granular structure; firm; neutral; clear, smooth boundary.

A3 (15-21″) Black (10YR 2/1) and very dark gray (10YR 3/1) silty clay loam; moderate, medium, granular structure; firm; neutral; clear, smooth boundary.

B21g (21-30″) Dark gray (10YR 4/1) silty clay loam; few, fine, distinct, yellowish-brown (10YR 5/6) mottles; very dark gray (10YR 3/1) patchy coatings; compound moderate, fine and medium, prismatic and moderate, angular blocky structure; firm; neutral; gradual, smooth boundary.

B22g (30-47″) Grayish-brown and light brownish-gray (2.5Y 5/2 and 6/2) light silty clay loam; few, fine, distinct, yellowish-brown (10YR 5/6 and 5/8) mottles; occasional dark gray (10YR 4/1) patchy coatings; occasional black (10YR 2/1) krotovina; compound weak, medium, prismatic and moderate, coarse, angular blocky structure; firm; neutral; gradual, smooth boundary.

IICg (47-60″ +) Olive-gray (5Y 5/2) and dark gray (10YR 4/1) silt loam; occasional strata of silty clay loam and some very fine sand; common, medium, prominent yellowish-brown (10YR 5/6 and 5/8) mottles; massive; mildly alkaline.

Drury Series (75)

The Drury series consists of deep, light-colored soils that are well drained and moderately well drained. In some places, these soils occupy gently sloping to steep colluvial areas adjacent to the base of upland bluffs. They also occur in outwash areas and on stream terraces. Drury soils are found mainly in the western one-third of Carroll County. These soils have formed in silty material under native forest vegetation. In Carroll County most Drury soils are used to grow corn, oats, and hay, but some areas remain in woodland.

Drury soils, although not extensive, are associated with a wide variety of other soils. Where Drury soils occur in footslope or colluvial positions, Seaton or Fayette soils, both developed in loess, often occur above them. In some areas Drury soils are associated with the similar, but darker colored, Worthen soils or the darker and more poorly drained Littleton soils. They are also associated with several soil series that have developed in outwash or lacustrine materials and in a variety of alluvial materials; these series usually occur at a lower elevation but are often adjacent to Drury.

Drury soils are moderately permeable and have high available water capacity. Thus, they are suited for building level terraces for erosion control. Drury soils are limited for ponds because they do not contain sufficient clay for adequate compaction.

Some areas are included in mapping that have loamy or sandy water-deposited material between 40 and 60 inches. A few areas have more clay in the B horizon than is normal for Drury soils.

The six mapping units that are shown on the soil map are 75B, 75C, 75C2, 75D2, 75E2, and 75F2.

Drury silt loam representative profile (75C):

A1 (0-4″) Very dark grayish-brown (10YR 3/2) silt loam; weak, medium, crumb structure; friable; many roots; slightly acid; clear, smooth boundary.

A2 (4-9″) Brown (10YR 5/3) silt loam with a few darker worm channel fillings; moderate, thin, platy structure; very friable; many roots; medium acid; clear, smooth boundary.

B1 (9-14″) Dark yellowish-brown (10YR 4/4) silt loam; weak, medium, subangular blocky structure; friable; many roots; medium acid; clear, smooth boundary.

B21 (14-20″) Dark yellowish-brown (10YR 4/4) silt loam; moderate, medium to coarse, subangular blocky structure; friable; common roots; few specks of very pale brown (10YR 7/3); medium acid; clear, smooth boundary.

B22 (20-38″) Dark yellowish-brown (10YR 4/4) silt loam; moderate, medium, subangular blocky structure; friable; common roots; few specks or coatings of dark brown (10YR 3/3) and very pale brown (10YR 7/3); medium acid; clear, smooth boundary.

B3 (38-45″) Brown to dark brown (10YR 5/3 to 4/3) silt loam; weak, coarse, subangular and angular blocky structure; friable; few roots; stains; slightly acid; gradual, smooth boundary.

C (45-60″ +) Brown and yellowish-brown (10YR 5/3 and 5/4) silt loam, massive to weak, coarse, angular blocky structure; very friable; some stratification with loam and very fine sandy loam; few roots in upper part; slightly acid.

Dubuque Series (950 With Palsgrove)

The Dubuque series consists of light-colored, well-drained soils which have limestone bedrock at depths between 20 and 40 inches. These soils occupy moderately sloping to very steep upland areas. Most Dubuque soils are in the north-central part of Carroll County, but other smaller areas are located in the sloping uplands of the western part of the county. Dubuque soils have formed partly in loess and partly in material weathered from the limestone bedrock. They have formed under forest vegetation. In Carroll County, most Dubuque soils are used for permanent pasture or woodland, but some less sloping areas are used to grow corn, oats, and hay.

In Carroll County Dubuque soils are mapped only with Palsgrove in an undifferentiated unit. Palsgrove soils differ primarily in having bedrock at depths between 40 and 60 inches. Palsgrove soils tend to occur in the less sloping portion of the mapping units. Dubuque and Palsgrove are geographically associated

with Dunbarton and Sogn soils, which have limestone bedrock at shallower depths and tend to occur on steeper slopes or areas where the loess cover is thinner.

Dubuque soils are moderately to moderately slowly permeable and have moderate available water capacity. The most favorable rooting zone extends to a depth of about 2 feet; below this depth limestone bedrock limits the penetration of roots. Because Dubuque soils have limestone bedrock between 20 to 40 inches, they are limited for basements, septic tank systems, cemeteries, and other structures requiring excavation. In some places, Dubuque soils are important as a source of agricultural limestone and stone for building and road construction. These soils are limited for ponds because water is lost as it seeps along fractures of the underlying bedrock.

Included in mapping are some areas which do not have the clayey layer above the limestone. In T23N, R4E, especially south of Argo, there are areas where the profile is developed in loamy to sandy sediments rather than in loess.

The 13 mapping units for Dubuque and Palsgrove soils are 950C, 950C2, 950D, 950D2, 950D3, 950E, 950E2, 950E3, 950F, 950F2, 950F3, 950G, and 950G2.

Dubuque silt loam representative profile (950C):

Ap (0-5") Dark grayish-brown (10YR 4/2) silt loam; weak, thin, platy to moderate, medium, crumb structure; friable; medium acid; abrupt, smooth boundary.

A2 (5-7") Brown (10YR 5/3) silt loam; weak, thin, platy to moderate, fine, crumb structure; friable; strongly acid; clear, smooth boundary.

B1 (7-13") Dark yellowish-brown (10YR 4/4) light silty clay loam; moderate, very fine, subangular blocky structure; friable; slightly acid; clear, smooth boundary.

B21t (13-25") Dark brown (7.5YR 4/4) silty clay loam; moderate, fine, subangular blocky structure; firm; discontinuous, dark brown (7.5YR 4/3) clay coatings; slightly acid; clear, smooth boundary.

IIB22t (25-29") Yellowish-red (5YR 4/6) with few spots of dark reddish-brown (5YR 2/2) clay; moderate, fine and medium, subangular and angular blocky structure; very firm; discontinuous, dark reddish-brown (5YR 3/3) clay coatings; mildly alkaline; clear, smooth boundary.

R (29" +) Very pale brown and yellow (10YR 7/4 and 7/6) dolomitic limestone bedrock, disintegrated in upper few inches; moderately alkaline; strong effervescence.

Dunbarton Series (505)

The Dunbarton series is made up of light-colored, well-drained soils that have dolomite or limestone bedrock at depths of less than 20 inches. They occur on strongly sloping to very steep upland areas, mainly in the western and north-central part of Carroll County. These soils have formed in a thin mantle of loess over clayey material which rests on bedrock. They have developed under forest vegetation and some areas are still forested. Other areas are used for pasture, and a few areas are cultivated.

Dunbarton soils are associated with Palsgrove, Woodbine, Dubuque, and Sogn soils. Sogn soils often occur on steeper slopes and lack the B horizon development of the Dunbarton soils. Dubuque soils occupy similar landscape positions but have bedrock at depths between 20 and 40 inches. Palsgrove and Woodbine soils tend to occupy the broader ridgetops where bedrock occurs below 40 inches.

The Dunbarton soils have moderate to slow permeability and low available water capacity. Because bedrock occurs at shallow depths, these soils are limited for basements and construction requiring excavation. They are limited for septic tank systems and for pond sites because of water seepage through cracks in the limestone bedrock. Dunbarton soils have potential as sources of agricultural limestone and road rock.

Some areas are included in mapping which do not have the clayey layer above the rock, and in some places the profile is developed in glacial drift. Some small areas in the upland south and east of Argo have loamy sediments above the rock and are more permeable and drouthy than typical Dunbarton soils.

The mapping units on the soil map are 505D2, 505D3, 505E, 505E2, 505E3, 505F, 505F2, 505F3, 505G, 505G2, and 505G3.

Dunbarton silt loam representative profile (505F2):

Ap (0-6") Dark grayish-brown and very dark grayish-brown (10YR 4/2 and 3/2) silt loam; moderate, very fine and fine, crumb structure; friable; neutral; abrupt, smooth boundary.

B1 (6-10") Dark brown (7.5YR 4/4) with spots of dark grayish-brown (10YR 4/2) heavy silt loam; weak, very fine and fine, subangular blocky structure; friable; medium acid; few chert pieces present; clear, smooth boundary.

IIB2t (10-19") Reddish-brown and yellowish-red (5YR 4/4 and 4/6) with few spots of black (5YR 2/1) clay; moderate, fine, subangular and angular blocky structure; extremely firm; discontinuous, dark reddish-brown (5YR 3/3 and 3/4) clay coatings; mildly alkaline; few chert pieces present; clear, smooth boundary.

R (19-60" +) Brownish-yellow and yellow (10YR 6/6 and 7/6) dolomitic bedrock, slightly disintegrated in upper few inches, moderately alkaline, strong effervescence.

Dunbarton, Cherty Variant (511)

This variant of the Dunbarton series consists of light-colored, well-drained soils, developed in very thin loess on cherty limestone or dolomite bedrock. Bedrock normally occurs at less than 20 inches, but depth to solid rock is often difficult to determine. These soils occur on very strongly sloping to very steep upland areas and developed under forest vegetation. They differ from the regular Dunbarton series in having a high chert content in the solum and underlying bedrock. Dunbarton, cherty variant soils are found primarily in the north-central part of the county north of the town of Mt. Carroll in areas drained by the Plum River and the East Fork of the Plum River.

Total acreage of this variant is small. Most areas are in pasture or timber, but a few areas are cultivated.

This variant is associated with the regular Dunbarton soils and with Dubuque and Palsgrove soils, which have a thicker loess cover and are deeper to bedrock. Fayette soils often occur on associated ridgetops and are developed entirely in loess.

Dunbarton, cherty variant soils have moderate to slow permeability and low available water capacity. The presence of bedrock at shallow depths limits the use of these soils for building sites, septic tank systems, and pond sites. Some areas, especially eroded mapping units, contain sufficient chert in the plow layer to make cultivation difficult.

The mapping units of the Dunbarton, cherty variant are 511E3, 511F, 511F3, and 511G2.

Dunbarton silt loam, cherty variant representative profile (511E3):

Ap (0-5″) Dark grayish-brown (10YR 4/2) silt loam with considerable chert; weak, fine, granular structure; friable; neutral; abrupt, smooth boundary.

IIB2t (5-14″) Dark reddish-brown to reddish-brown (5YR 3/4 to 4/4) cherty silty clay; moderate, very fine, blocky structure; very firm; neutral; gradual, wavy boundary.

R (14-60″ +) Yellowish-brown and brownish-yellow (10YR 5/8 and 6/6) limestone bedrock with high chert content; moderately alkaline; strong effervescence.

Durand Series (416)

The Durand series consists of deep, dark-colored soils that are moderately well drained and well drained. They occur on moderately sloping to very strongly sloping upland areas, primarily in the eastern part of the county. They have formed partly in silty loess but mostly in the underlying loamy glacial till or drift under grass vegetation. Loess thickness is usually 15 to 25 inches. These soils are used primarily for corn, oats, and hay.

Durand soils occur frequently with Argyle and Ogle soils. Durand and Argyle soils occupy similar landscape positions, but Durand soils have developed under grass vegetation. In many places Durand soils occupy the more sloping areas adjacent to Ogle soils. Durand and Argyle soils formed mostly in drift, but Ogle soils formed partly in loess and partly in drift. Tama soils, developed entirely in loess, also occur on associated ridgetops where Durand soils occur on side slopes.

Durand soils have moderate permeability and a high available water capacity.

Included in mapping are a few areas where loess cover is thinner than 15 inches and calcareous unweathered till occurs as shallow as 2 to 3 feet. Solum thickness is normally 4 feet or more.

The mapping units for the Durand series are 416C, 416C2, 416D2, 416D3, 416E2, and 416E3.

Durand silt loam representative profile (416C):

A1 (0-11″) Black (10YR 2/1) silt loam; moderate, very fine to fine, granular structure; friable; many roots; neutral; clear, smooth boundary.

A3 (11-15″) Very dark grayish-brown (10YR 3/2) silt loam; moderate, fine to medium, subangular blocky structure; friable; many roots; neutral; clear, smooth boundary.

B21 (15-24″) Dark yellowish-brown (10YR 3/4 and 4/4) silty clay loam; moderate, fine to medium, subangular blocky structure; firm; common roots; few light gray (10YR 7/2) silt coatings; strongly acid; clear, smooth boundary.

IIB22t (24-36″) Dark brown to brown (7.5YR 4/4) clay loam; moderate, medium, subangular blocky structure; firm; common roots; continuous, dark brown (7.5YR 4/3) clay films; strongly acid; clear, smooth boundary.

IIB23t (36-60″ +) Dark brown to strong brown (7.5YR 4/4 and 5/6) clay loam; moderate to weak, coarse, subangular blocky structure; firm; few roots in upper part; discontinuous, dark reddish-brown (5YR 3/4) clay films; medium acid. II material, till or drift, is weathered to the dolomitic bedrock that occurs at 110 inches.

Edgington Series (272)

This series consists of deep, dark-colored soils that are poorly drained. Edgington soils occupy depressional to nearly level positions on the upland and on terraces; they occur in small areas throughout the county but are not extensive. Edgington soils have formed in deep loess or silty materials under water-tolerant grasses. These soils are primarily used for growing corn.

Edgington soils are predominantly geographically associated with Tama, Muscatine, and Atterberry soils. In some places poorly drained Edgington soils lie in small depressions enclosed by broad areas of somewhat poorly drained Muscatine or Atterberry soils. In the upland, Edgington often occurs in depressions surrounded by moderately well-drained and well-drained Tama soils.

Some areas of Edgington on terrace positions may be developed in slightly less than 5 feet of loess or silty material. The few Edgington areas associated with Littleton and Worthen on the terrace northeast of Thomson are probably developed in water-deposited silty sediments.

Edgington soils have moderately slow to slow permeability and high available water capacity. These soils are limited for septic tank filter fields and tile drainage systems because they are slowly permeable.

The two mapping units shown on the soil map are 272 and 272+. The 272+ areas have received recently washed-in sediments.

Edgington silt loam representative profile (272):

A11 (0-16″) Black (10YR 2/1) silt loam; moderate, medium, granular structure; friable; many roots; slightly acid; gradual, smooth boundary.

A12 (16-20″) Very dark brown (10YR 2/2) and very dark grayish-brown (10YR 3/2) silt loam; moderate, medium,

granular structure; friable; many roots; strongly acid; clear, smooth boundary.

A2 (20-31") Dark grayish-brown (10YR 4/2) and grayish-brown (10YR 5/2) silt loam; few, fine, faint, dark yellowish-brown (10YR 4/4) mottles; weak, medium, platy structure breaking to weak, fine, granular structure; friable; common roots; very dark brown (10YR 2/2) and black (10YR 2/1) iron concretions; strongly acid; clear, smooth boundary.

B1g (31-35") Dark gray (5Y 4/1) light silty clay loam; few, fine, distinct, yellowish-brown (10YR 5/4) mottles; moderate, fine, subangular blocky structure; friable; few roots; very dark brown (10YR 2/2) and black (10YR 2/1) iron-manganese concretions; strongly acid; gradual, smooth boundary.

B21tg (35-41") Gray (10YR 5/1) silty clay loam; few, fine, distinct, dark yellowish-brown (10YR 4/4) and yellowish-brown (10YR 5/6) mottles; weak, medium, prismatic structure breaking to moderate to strong, fine and medium, angular blocky structure; firm; few roots; discontinuous, dark gray (10YR 4/1) clay films; very dark brown (10YR 2/2) and black (10YR 2/1) iron concretions; medium acid; gradual, smooth boundary.

B22tg (41-49") Gray (10YR 5/1) silty clay loam; common, fine, prominent, dark brown (7.5YR 4/4) and yellowish-brown (10YR 5/6) mottles; weak, medium and coarse, prismatic structure breaking to strong, medium, angular blocky structure; firm; few roots; discontinuous, dark gray (10YR 4/1) and very dark gray (10YR 3/1) clay films; very dark brown (10YR 2/2) and black (10YR 2/1) iron concretions; medium acid; clear, smooth boundary.

B3g (49-55") Gray (10YR 5/1 and 6/1) and light brownish-gray (10YR 6/2) light silty clay loam; many, fine, prominent, dark brown (7.5YR 4/4) and strong brown (7.5YR 5/6 and 5/8) mottles; weak, medium and coarse, angular blocky structure; firm; few roots; discontinuous, dark gray (10YR 4/1) clay films; very dark brown (10YR 2/2) and black (10YR 2/1) iron concretions; very dark gray (10YR 3/1) krotovina crosses horizon; medium acid; gradual, smooth boundary.

Cg (55-60") Mixed gray (10YR 5/1 and 6/1), especially in channel fillings, yellowish-brown (10YR 5/6) and light brownish-gray (10YR 6/2) silt loam; massive; friable; few, soft, dark brown (7.5YR 3/2) concretions; slightly acid.

Eleroy Series (949 With Derinda)

This series consists of light-colored, moderately well-drained and well-drained soils that are deep to underlying shale bedrock. These soils occupy moderately sloping to steep upland positions and occur mainly in small areas across the extreme northern part of the county and in an area between the towns of Wacker and Argo. Eleroy soils are formed dominantly in loess, averaging 30 to 50 inches in thickness, but partly in underlying shale under forest vegetation. Relatively unweathered shale occurs at depths between 40 and 60 inches. Eleroy soils are used to grow corn, oats, hay, and pasture, and as woodland.

Eleroy soils are mapped with Derinda soils in an undifferentiated unit. Derinda soils have developed in thinner loess, 15 to 30 inches, and unweathered shale occurs at depths of 20 to 40 inches. Eleroy soils tend to be more dominant in the less sloping mapping units, where loess thickness is usually greater.

Eleroy and Derinda soils are geographically associated with Dunbarton, Dubuque, and Palsgrove soils, which have limestone bedrock at less than 60 inches and occur on similar slopes and topographic positions. In some places Fayette soils occupy ridgetops adjacent to Eleroy and Derinda soils. In the western parts of the county Seaton soils may occur on the associated ridgetops.

Eleroy soils have moderate permeability in the portion of the solum derived from loess and slow permeability in the shale bedrock. Available water capacity is moderate to high. The most favorable rooting zone is in the loess portion of the profile. The high clay and lime content of the shale bedrock limits root penetration. Septic tank filter fields are limited because of the slow permeability in the lower part of the solum and the unaltered shale. In some places septic tank effluent will seep out at the surface on lower slopes. The underlying shale has a high shrink-swell ratio because of its high clay content.

In some areas of these soils a few inches of glacial drift may be found between the loess and the shale bedrock.

The mapping units which contain Eleroy and Derinda soils are 949C2, 949D2, 949D3, 949E2, 949E3, and 949F2. The profile described here has a thicker total A horizon than most areas of cultivated Eleroy soils.

Eleroy silt loam representative profile (949E2):

Ap (0-7") Dark grayish-brown (10YR 4/2) silt loam; moderate, medium, granular structure; friable; slightly acid; abrupt, smooth boundary.

A2 (7-12") Grayish-brown (10YR 5/2) silt loam; weak, medium and thick, platy structure parting to weak, fine and medium, granular structure; friable; slightly acid; clear, wavy boundary.

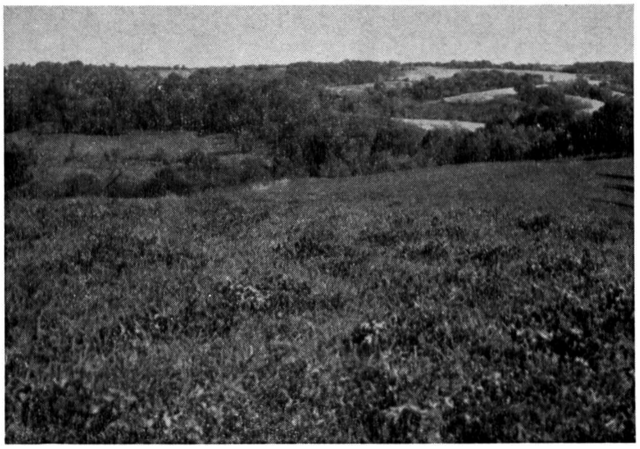
B1t (12-15") Dark yellowish-brown (10YR 4/4) light silty clay loam; moderate, medium, subangular blocky structure; firm; some light gray (10YR 7/2) silt coatings when dry; slightly acid; clear, smooth boundary.

B21t (15-22") Dark yellowish-brown (10YR 4/4) silty clay loam; strong, medium, subangular blocky structure; firm; thin, continuous, brown (10YR 4/3) clay films; few very dark brown (10YR 2/2) iron-manganese concretions; medium acid; gradual, smooth boundary.

B22t (22-32") Dark yellowish-brown (10YR 4/4) silty clay loam; few, medium, faint, yellowish-brown (10YR 5/8) mottles; moderate, medium, subangular blocky structure; firm; moderately thick, continuous, brown (10YR 4/3) clay films; medium acid; gradual, smooth boundary.

IIB3t (32-41") Olive-brown (2.5Y 4/3) heavy silty clay loam; few, medium, distinct, yellowish-brown (10YR 5/8) mottles; weak, coarse, subangular blocky structure; firm; thin, discontinuous, dark grayish-brown (10YR 4/2) clay films; few pebbles of igneous rock; slightly acid; abrupt, smooth boundary.

IICg (41-50") Greenish-gray (5GY 6/1) clay shale; common, coarse, prominent, light olive-brown (2.5Y 5/4) mottles; massive; very firm; moderately alkaline; strong effervescence.



Typical example of a Fayette soil landscape northeast of Savanna. Fayette soils occur on ridgetops and slopes, with a few shallow to bedrock areas on the steepest slopes. (Fig. 14)

Fayette Series (280)

The Fayette series consists of deep, light-colored soils that are well drained. These are gently sloping to very steep soils in the upland and on terrace benches and are extensive in the central and north-central part of the county. Fayette soils formed in more than 5 feet of loess under forest vegetation. The primary use of these soils is for the production of corn, oats, hay, and pasture, and as woodland.

Fayette soils are predominantly geographically associated with Rozetta, Sylvan, and Downs soils. In some places the Fayette soils lie on more sloping areas adjacent to the moderately well-drained ridgetop Rozetta soils. Fayette soils tend to occupy less sloping positions than the thin-subsoil Sylvan soils. Fayette soils occupy the more sloping positions next to the grassland-influenced Downs soils.

They are also associated with Dunbarton, Dubuque, and Palsgrove soils, which have limestone bedrock at less than 5 feet and occur on slopes in areas where Fayette occurs and on narrow ridgetops where the loess is thicker than 5 feet.

Some areas are included with Fayette where the surface horizon or plow layer is darker colored than normal. In a few areas calcareous loess occurs at less than 40 inches; some areas are only moderately well drained.

A large number of mapping units are shown on the soil map. They are 280B, 280B2, 280C, 280C2, 280D, 280D2, 280D3, 280E, 280E2, 280E3, 280F, 280F2, 280F3, 280G, and 280G2.

Fayette silt loam representative profile (280E):

A1 (0-5") Very dark grayish-brown (10YR 3/2) silt loam; moderate, medium, granular structure; very friable; many roots; neutral; clear, smooth boundary.

A2 (5-10") Dark grayish-brown (10YR 4/2) silt loam; moderate, medium, platy structure; very friable; many roots; very dark grayish-brown (10YR 3/2) organic coatings; strongly acid; clear, smooth boundary.

B1 (10-13") Dark yellowish-brown (10YR 4/4) silt loam; weak, medium, subangular blocky structure; very friable; many roots; light gray (10YR 7/1) silt coatings when dry; medium acid; clear, smooth boundary.

B21t (13-17") Dark yellowish-brown (10YR 4/4) light silty clay loam; weak to moderate, medium, subangular blocky structure; firm; common roots; brown (10YR 4/3) clay films; light gray (10YR 7/1) silt coatings when dry; medium acid; clear, smooth boundary.

B22t (17-30") Yellowish-brown (10YR 5/4) silty clay loam; moderate, medium, subangular blocky structure; firm; common roots; brown (10YR 5/3) clay films; light gray (10YR 7/1) silt coatings when dry; medium acid; clear, smooth boundary.

B23t (30-43") Yellowish-brown (10YR 5/4) silty clay loam; moderate, medium, subangular and angular blocky structure; firm; few roots; few brown (10YR 5/3) clay films; few light gray (10YR 7/1) silt coatings when dry; medium acid; clear, smooth boundary.

B3 (43-47") Brown (10YR 5/3) light silty clay loam; few, medium, distinct, yellowish-red (5YR 4/6) mottles; weak to moderate, coarse, subangular and angular blocky structure; friable; medium acid; clear, smooth boundary.

C (47-60" +) Yellowish-brown (10YR 5/4) silt loam; common, medium, faint, pale brown (10YR 6/3) and yellowish-brown (10YR 5/8) mottles; massive to weak, coarse, subangular blocky structure; very friable; slightly acid.

Flagg Series (419)

This series consists of deep, light-colored soils that are well drained. These are gently sloping to very strongly sloping upland soils located mainly in the southwest and west-central parts of the county and in the central part of the eastern boundary in T24N, R7E. They have formed partly in silty loess and partly in underlying loamy glacial drift under forest vegetation. The loess cover averages 30 to 50 inches thick. Flagg soils are used primarily to grow corn, oats, and hay.

Flagg soils are commonly associated with Pecatonica and Strawn soils. Flagg, Pecatonica, and Strawn soils occupy slopes on similar upland landscapes. Flagg soils formed partly in loess and partly in drift, but Pecatonica and Strawn soils formed mostly in drift. Downs and Fayette soils, both developed entirely in loess, are also associated in some areas.

Flagg soils have moderate permeability and very high to high available water capacity.

Included in mapping in the southwestern part of the county are a few areas which have silt loam rather than silty clay loam B2 horizons developed in the loess portion of the solum and a few areas which have darker surface horizons than described here.

The mapping units occurring in the county are 419B, 419C, 419C2, 419D, 419D2, 419D3, 419E2, and 419E3.

Flagg silt loam representative profile (419D):

Ap (0-7″) Dark grayish-brown to brown (10YR 4/2 to 4/3) silt loam; cloddy breaking to moderate, fine and medium, crumb structure; friable; neutral; abrupt, smooth boundary.

A2 (7-10″) Brown (10YR 5/3) silt loam; moderate, medium, crumb structure; friable; neutral; clear, smooth boundary.

B1 (10-15″) Dark yellowish-brown (10YR 4/4) light silty clay loam; moderate, fine, subangular blocky structure; firm; medium acid; clear, smooth boundary.

B21t (15-23″) Yellowish-brown and dark yellowish-brown (10YR 5/4 and 4/4) silty clay loam; strong, fine and medium, subangular blocky structure; firm; brown and dark brown (7.5YR 4/4) discontinuous clay films on all ped surfaces; few light gray (10YR 7/1) silt coats when dry, with heaviest concentration in lower part of horizon; strongly acid; clear, smooth boundary.

B22t (23-30″) Yellowish-brown (10YR 5/4) silty clay loam; moderate to strong, medium, subangular blocky structure; firm; discontinuous, brown and dark brown (7.5YR 4/4) clay films; continuous, light gray (10YR 7/1 and 7/2) silt coats when dry; strongly acid; clear, smooth boundary.

B23t (30-39″) Yellowish-brown (10YR 5/4 and 5/5) silty clay loam; moderate, medium, subangular and angular blocky structure; firm; brown and dark brown (7.5YR 5/4 and 4/4) discontinuous clay films; few black (10YR 2/1) spots; silt coats as in B22t; medium acid; clear, smooth boundary. Some sand noted in lower part, but horizon is dominantly loess.

IIB24t (39-62″) Dark brown and strong brown (7.5YR 4/4 and 5/6) heavy clay loam; weak, medium and coarse, angular blocky structure; firm; few iron stains of black (7.5YR 2/1); brown (7.5YR 5/4) discontinuous clay films; occasional light gray (10YR 7/1) silt coats at top of horizon; medium acid; gradual, smooth boundary.

IIB25t (62-74″ +) Dark brown (7.5YR 4/4) and reddish-brown (5YR 4/4), with occasional small areas or zones of yellowish-brown (10YR 5/6), clay loam; weak, coarse, angular blocky structure; firm; few black (7.5YR 2/1) stains; dark reddish-brown (5YR 3/2 and 3/3) discontinuous clay films; neutral.

Fox Series (972 or X With Casco)

The Fox series is composed of light-colored, well-drained soils that are moderately deep to deep to underlying calcareous gravel. Fox soils occur on strongly and very strongly sloping sites where water-deposited sand and gravel occur as small knobs and ridges. Total acreage is very small, and occurrence is mainly in upland areas in the southern part of the county. These soils developed under forest vegetation where loamy water-deposited sediments and occasionally some loess were deposited over the sand and gravel. The coarse material occurs at depths between 24 and 40 inches. Most areas are used for pasture or remain forested. Few areas are cultivated.

Fox soils are associated with Rodman and Casco soils. In most places, Rodman and Casco soils occupy the more sloping areas of the ridges and knobs. Fox soils are deeper to underlying gravelly material than Rodman and Casco soils. Because of considerable variation in depth to sand and gravel over short distances, Fox and Casco soils are mapped together as a soil complex in Carroll County. Soils derived from glacial till and from loess occur adjacent to this complex in most areas.

The Fox soils have moderate permeability and moderate available water capacity. The most favorable rooting zone extends to a depth of about 2 to 3½ feet. Below this depth is calcareous gravel, which is very low in water-holding capacity and high in natural lime. Because Fox soils have very permeable underlying gravel, unfiltered sewage from septic tanks can contaminate water supplies. The overburden in areas of Fox and Casco soils is relatively thin, and the underlying material can serve as a source of gravel and sand.

Some areas that have darker colored surface horizons and less clay in the B2 horizons than is described here have been included in mapping.

The mapping units for the complex of Fox and Casco soils are 972D2 or XD2, 972E2 or XE2, and 972E3 or XE3. The profile described here has a thicker total A horizon than most areas of cultivated Fox soils.

Fox silt loam representative profile (972D2):

A1 (0-4″) Very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, granular structure; friable; many roots; neutral; clear, smooth boundary.

A2 (4-9″) Dark grayish-brown and grayish-brown (10YR 4/2 and 5/2) silt loam; weak, medium, platy structure; friable; many roots; medium acid; clear, smooth boundary.

B1 (9-12″) Brown (10YR 4/3) light silty clay loam; moderate, fine to medium, subangular blocky structure; friable; many roots; slightly acid; clear, smooth boundary.

B21t (12-16″) Dark yellowish-brown to yellowish-brown (10YR 4/4 to 5/4) silty clay loam; occasional fine gravel present; strong, fine to medium, subangular blocky structure; firm; many roots; brown (10YR 4/3) clay films; slightly acid; clear, smooth boundary.

B22t (16-22″) Dark yellowish-brown to yellowish-brown (10YR 4/4 to 5/4) silty clay loam; some sand and occasional fine gravel present; strong, medium to coarse, subangular and angular blocky structure; firm; many roots; continuous, brown (10YR 4/3) clay films; slightly acid; clear, smooth boundary.

IIB23t (22-36″) Reddish-brown (5YR 4/4) clay loam, containing some gravel; moderate, medium to coarse, subangular blocky structure; firm; common roots; continuous, reddish-brown (5YR 4/3) clay films; slightly acid; clear, smooth boundary.

IIB3t (36-39″) Reddish-brown and yellowish-red (5YR 4/4 and 4/6) gravelly clay loam; moderate, medium, subangular blocky structure; firm; common roots; reddish-brown (5YR 4/3) clay films; neutral; abrupt, smooth boundary.

IIC (39-60″ +) Brownish-yellow and light gray (10YR 6/6 and 7/2) limestone gravel and cobbles with multicolored igneous rocks; single grained; loose; moderately alkaline; strong to violent effervescence. In some places tongues of the IIB3t horizon penetrate into the C horizon.

Gale Series (413)

This series consists of light-colored, well-drained soils that are moderately deep to deep over sandstone bedrock. Depth to consolidated sandstone bedrock is

normally 3 to 5 feet. Gale soils occupy strongly sloping to steep upland positions in a few small areas in the extreme eastern part of Carroll County in T23N, R7E and T24N, R7E. The acreage is small. These soils have formed partly in silty loess and partly in the underlying sandstone under forest vegetation. Gale soils are used mostly to grow corn, oats, and hay, but some steep areas are used mainly for permanent pasture and woodland.

Gale soils are commonly associated with Palsgrove, Woodbine, and Pecatonica soils. In most places Gale soils occupy upland slopes similar to these other three soils, but Gale soils are formed mainly in silty material and partly in the underlying sandstone. Palsgrove soils are formed partly in silty material and partly in the underlying limestone bedrock. Pecatonica soils are formed partly in silty material and partly in an underlying reddish drift. Woodbine soils are developed primarily in drift with limestone bedrock between 40 and 60 inches.

Gale soils are moderately permeable and have low to moderate available water capacity. The most favorable rooting zone is limited to a depth of about 40 inches; below this depth the low moisture capacity of the sandstone limits root growth. Septic tank filter fields are limited because effluent may move rapidly through the sandstone and contaminate water supplies. Gale soils are limited for ponds because water can seep away through the underlying sandstone.

Because of the small acreage of soils underlain by sandstone in the county, this series was allowed to range considerably in mapping. Some small areas with dark surface color are included in the northeast corner of Section 7, T23N, R7E. Sandstone outcrops in a few places in the mapping units, and depth to consolidated sandstone is quite variable.

The mapping units for the Gale soils are 413D2 and 413F2.

Gale silt loam representative profile (413D2):

Ap (0-7") Dark grayish-brown (10YR 4/2) silt loam; weak, fine, granular structure; friable; many roots; slightly acid; abrupt, smooth boundary.

B1 (7-11") Dark yellowish-brown (10YR 4/4) silt loam with some darker root channel fillings; weak, medium, subangular blocky structure; friable; common roots; medium acid; clear, smooth boundary.

B21t (11-23") Dark yellowish-brown (10YR 4/4) heavy silt loam; moderate, medium, subangular blocky structure; friable; few roots; thin clay films; few light brownish-gray (10YR 6/2) silt coatings when dry; strongly acid; clear, smooth boundary.

B22t (23-33") Dark yellowish-brown (10YR 4/4) light silty clay loam; moderate, medium, subangular blocky structure; firm; few roots; thin clay films; light brownish-gray (10YR 6/2) silt coatings when dry; strongly acid; clear, wavy boundary.

IIB3 (33-38") Yellowish-brown (10YR 5/4) and strong brown (7.5YR 5/6) sandy loam; weak, medium to coarse, subangular blocky structure; friable; few roots; strongly acid; clear, wavy boundary.

IIC (38-50") White (10YR 8/2) with bands of brownish-yellow (10YR 6/6) sand; single grained; loose; medium acid; contains occasional sandstone fragment; clear, wavy boundary.

R (50" +) White and light gray (10YR 8/2 and 7/2) sandstone bedrock.

Gilford Series (201)

This series consists of dark-colored, very poorly and poorly drained soils that are deep to underlying loose sand. These soils occupy nearly level areas and depressions on the Mississippi River terraces in the southwestern part of the county. Gilford soils have formed in sandy material under water-tolerant grasses. Most areas of these soils are used to grow corn, oats, and hay. Gilford soils are inextensive in Carroll County.

Gilford soils are predominantly geographically associated with Ade, Hoopeston, and Selma soils. In most places, the poorly drained Gilford soils lie in depressions next to the better drained Hoopeston and Ade soils. Selma soils occupy positions similar to Gilford soils but are less sandy.

Gilford soils have moderately rapid permeability and moderate available water capacity. The most favorable rooting zone in these soils occurs above the C horizon, which is normally sand or occasionally loamy sand texture. Septic tank filter fields are limited because this soil has a seasonally high water table.

The only mapping unit for this series is 201.

Gilford fine sandy loam representative profile (201):

Ap (0-8") Black (10YR 2/1) fine sandy loam; weak, medium, granular structure; very friable; many roots; very high organic matter content; neutral; abrupt, smooth boundary.

A12 (8-20") Black and very dark gray (10YR 2/1 and 3/1) fine sandy loam; very thin lenses and individual sand grains of dark gray and gray (10YR 4/1 and 5/1); weak, coarse, granular structure; very friable; common roots; neutral; clear, smooth boundary.

B21g (20-27") Dark gray (10YR 4/1) fine sandy loam; weak, medium, subangular blocky structure; very friable; few roots; few very dark gray (10YR 3/1) organic coatings; slightly acid; clear, smooth boundary.

B22g (27-35") Gray and grayish-brown (2.5Y 5/1 and 5/2) fine sandy loam (some loamy fine sand); weak, medium and coarse, subangular blocky structure; very friable; few roots; slightly acid; clear, smooth boundary.

B3g (35-44") Gray and light gray (5Y 5/1 and 6/1) sandy loam (some loamy sand); weak, medium and coarse, subangular blocky structure; very friable; neutral; gradual, smooth boundary.

Cg (44-60" +) Gray and light gray (5Y 5/1 and 6/1) loamy sand to sand; single grained; loose; neutral.

Hamburg Series (30)

The Hamburg series consists of deep, light-colored soils that are somewhat excessively to well drained. These soils occupy strongly sloping to very steep up-

lands on the bluffs facing the Mississippi River. Hamburg soils have formed in areas where loess is several feet thick. In Carroll County most Hamburg soils are used for pasture or woodland, but some areas are occasionally used for cropland.

Hamburg soils are geographically associated with the Timula and Seaton soils. They often occupy the face or crest of the upland bluffs adjacent to the Mississippi River floodplains or terraces. Timula and Seaton soils may occupy similar positions but also lie on slopes adjacent to the tributaries of the Mississippi River. Hamburg soils are calcareous at or near the surface and do not have a developed B horizon. Timula soils have a silt loam B horizon and are calcareous at depths less than 40 inches. Seaton soils have a silt loam B horizon or subsoil and are calcareous at depths greater than 40 inches.

Hamburg soils have moderate to moderately rapid permeability and low to moderate available water capacity. These soils have a high natural lime content and a low availability of phosphate and potash. Because Hamburg soils have favorable permeability, they are suited for building level terraces for erosion control. Hamburg soils are limited for ponds and lakes because they do not contain sufficient clay for adequate compaction.

The three mapping units shown on the soil maps are 30D2, 30F2, and 30G2.

Hamburg silt loam representative profile (30F2):

A1 (0-3″) Very dark grayish-brown (10YR 3/2) coarse silt loam; weak, fine to medium, crumb structure; very friable; many roots; small carbonate concretions present; mildly alkaline; strong effervescence; clear, smooth boundary.

C1 (3-22″) Brown (7.5YR 5/4) coarse silt loam; weak, fine, granular structure; very friable; many roots; small carbonate concretions present; moderately alkaline; violent effervescence; gradual, smooth boundary.

C2 (22-60″ +) Brown (7.5YR 5/4) and pale brown (10YR 6/3) coarse silt loam; massive in place, breaking to weak, fine, subangular blocky structure; very friable; common roots in upper part of horizon; small carbonate concretions present; moderately alkaline; violent effervescence.

Hitt Series (506)

This series consists of dark-colored, well-drained soils that are deep to underlying dolomitic limestone bedrock. They occupy moderately sloping to steep upland positions, mainly in the eastern half of the county. Hitt soils have formed partly in silty loess but mostly in loamy glacial material (drift) on limestone bedrock under grass vegetation. Hitt soils are used mainly to grow corn, oats, and hay.

Hitt soils are geographically associated with Ashdale, Tama, Durand, and Ogle soils. Hitt and Ashdale soils occupy similar landscape positions. Hitt soils are developed mostly in loamy material on limestone bedrock, but Ashdale soils are developed dominantly in silty material or loess on limestone bedrock. Hitt soils, in some places, lie on the more sloping areas below Ogle and Tama soils that occupy the ridgetops. Ogle soils formed partly in loess and partly in the underlying loamy drift; bedrock is below 5 feet. Tama is developed entirely in loess. Durand soils are similar to Hitt soils but do not have bedrock within 5 feet of the surface.

Hitt soils have moderate permeability and high to moderate available water capacity. The rooting zone is limited by the limestone bedrock, which occurs at depths between 40 and 60 inches. Septic tank filter fields are limited because unfiltered sewage can enter cracks and crevices in the bedrock and contaminate water supplies. Because the underlying limestone bedrock allows water to seep away through fractures, ponds are limited on Hitt soils. This soil could be used as a source for agricultural limestone or road rock.

Included in mapping are some areas that have bedrock at depths of less than 40 inches, especially on the steeper sloping units.

The mapping units found on the soil map are 506C2, 506D2, 506D3, 506E2, and 506F2.

Hitt silt loam representative profile (506C2):

Ap (0-6″) Black (10YR 2/1) silt loam; moderate, fine and coarse, granular structure; friable; slightly acid; clear, smooth boundary.

A3 (6-15″) Very dark grayish-brown (10YR 3/2) silt loam; moderate, fine and medium, granular structure; friable; slightly acid; gradual, smooth boundary.

B1t (15-19″) Brown (7.5YR 4/4) silty clay loam; weak to moderate, fine and medium, subangular blocky structure; firm; thin, discontinuous, dark brown (10YR 3/3) clay films; medium acid; clear, smooth boundary.

IIB21t (19-24″) Dark brown (7.5YR 4/4) clay loam; moderate, fine, subangular blocky and angular blocky structure; firm; thin, continuous, reddish-brown (5YR 4/3) clay films; strongly acid; clear, smooth boundary.

IIB22t (24-37″) Dark reddish-brown (5YR 3/4) clay loam; moderate, fine, subangular blocky and angular blocky structure; very firm; thin, continuous, reddish-brown (5YR 4/3) clay films; few chert fragments; strongly acid; clear, smooth boundary.

IIIB3t (37-42″) Reddish-brown (5YR 4/4) silty clay; moderate, medium and coarse, angular blocky structure; very firm; thin, discontinuous, reddish-brown (5YR 4/3) clay films; many chert fragments; medium acid; abrupt, smooth boundary.

R (42-60″ +) Limestone (dolomite) bedrock with some sandy loam broken limestone in places; moderately alkaline; strong effervescence.

Hoopeston Series (172 and 237)

The Hoopeston series is made up of dark, somewhat poorly drained soils that are generally deep to the underlying loose sand. These are nearly level soils on terraces of the Mississippi River in the southwestern part of Carroll County. They are inextensive. They formed from sandy material under a grassland vegetation. Two surface texture phases are recognized that

are otherwise similar soils: Hoopeston sandy loam (172) and Hoopeston loam (237). Hoopeston loam is the more extensive surface texture phase in the county. The primary use of these soils is for corn, oats, and hay.

Hoopeston soils are geographically associated with Dickinson and Selma soils. Dickinson soils have better natural drainage, while Selma soils tend to be more poorly drained and finer textured. Two bottomland soils, Otter and Sawmill, are adjacent to Hoopeston loam in some areas.

Hoopeston soils have moderately rapid permeability and moderate available water-holding capacity. The most favorable rooting zone occurs above the C horizon, which has loamy sand or sand texture. Because Hoopeston soils have moderately rapid permeability, unfiltered sewage from septic tanks can contaminate water supplies.

The mapping units shown on the soil map are 172, 237, 237+, and 237. Most of the 237+ areas, located along the lower end of Johnson Creek, at some time received silt loam sediments averaging 7 to 20 inches thick that cover the original loam surface. The 237 units, which are wet, are more poorly drained than is normal for this series.

Hoopeston loam representative profile (237):

Ap (0-8″) Black (10YR 2/1) light loam; weak, medium and coarse, granular structure; friable; common roots; neutral; abrupt, smooth boundary.

A3 (8-13″) Mixed very dark brown and dark brown (10YR 2/2 and 3/3) sandy loam; common, medium, distinct, yellowish-red (5YR 4/8) mottles; weak, fine, subangular blocky structure; very friable; common roots; neutral; clear, smooth boundary.

B21 (13-22″) Dark brown to brown (10YR 4/3) sandy loam; common, fine, faint, grayish-brown (10YR 5/2) and common, medium, distinct, yellowish-red (5YR 4/8) mottles; weak, medium, subangular blocky structure; very friable; few roots; slightly acid; clear, smooth boundary.

B22 (22-28″) Dark brown to brown (10YR 4/3) light sandy loam; many, medium, faint, grayish-brown (10YR 5/2) and many, medium, distinct, strong brown (7.5YR 5/8) mottles; weak, coarse, subangular blocky structure; very friable to loose; few roots; slightly acid; gradual, smooth boundary.

C1 (28-39″) Brown and yellowish-brown (10YR 5/3 and 5/4) loamy sand; many, medium, faint, grayish-brown (10YR 5/2) and many, medium to coarse, distinct, strong brown (7.5YR 5/8) mottles; single grained; loose; few roots; few, soft, black (5YR 2/1) iron-manganese concretions; neutral.

C2 (39-70″ +) Mixed grayish-brown and brown (10YR 5/2 and 5/3), strong brown (7.5YR 5/8), and dark reddish-brown (5YR 3/4) loamy sand; single grained; loose; abundant, large, soft, black and dark reddish-brown (5YR 2/1 and 2/2) iron-manganese concretions; mildly alkaline.

Huntsville Series (77)

The Huntsville series consists of deep, dark-colored soils which are well and moderately well drained. These soils lie on nearly level bottomlands, mainly in the eastern and southern parts of the county. Huntsville soils have formed in silty, waterlaid sediments derived primarily from upland areas developed under grass vegetation. They are used mainly for growing corn, oats, and hay.

Huntsville soils are geographically associated with the Lawson soils. In most places the better drained Huntsville soils occupy higher bottomland positions than the somewhat poorly drained Lawson soils.

Huntsville soils are moderately permeable and have very high available water capacity.

A few areas included in this mapping unit have loam-textured surface horizons and slopes that exceed 2 percent.

The mapping unit of this series is 77.

Huntsville silt loam representative profile (77):

A11 (0-15″) Very dark grayish-brown (10YR 3/2) silt loam; weak, fine and medium, granular structure; friable; neutral; clear, smooth boundary.

A12 (15-27″) Very dark grayish-brown (10YR 3/2) and small amounts of dark brown (10YR 3/3) silt loam; weak, medium, granular structure; friable; slightly acid; clear, smooth boundary.

A13 (27-35″) Very dark grayish-brown and dark brown (10YR 3/2 and 3/3) with few thin strata of brown and dark grayish-brown (10YR 5/3 and 4/2) silt loam; weak, medium, granular structure; friable; slightly acid; diffuse, smooth boundary.

C (35-53″) Dark brown (10YR 3/3) with small amount of very dark grayish-brown (10YR 3/2) silt loam; few, fine, faint, dark yellowish-brown (10YR 3/4) spots or mottles; weak, medium, granular structure; friable; slightly acid.

Joy Series (275)

The Joy series consists of deep, dark-colored soils that are somewhat poorly drained. These are nearly level to gently sloping soils of the uplands, occurring primarily south and west of Chadwick and near Wacker. They have formed in more than 5 feet of loess under native grass vegetation. They have weakly developed silt loam B2 horizons. These soils are primarily used for corn, oats, and hay.

Joy soils are geographically associated with Port Byron and Mt. Carroll soils. In most places, Joy soils occupy the less sloping or nearly level ridgetops and Port Byron soils occupy side slopes adjacent to drainageways. Near timbered areas well-drained Mt. Carroll soils occupy ridgetops and slopes that have been influenced by forest vegetation.

Joy soils have moderate permeability and a very high available water capacity. Because Joy soils have favorable permeability, they are suited for building level terraces for erosion control. Joy soils are limited for ponds and lakes because they do not contain sufficient clay for adequate compaction.

The two mapping units shown on the soil maps are 275A and 275B.

Joy silt loam representative profile (275A):

Ap (0-10″) Black (10YR 2/1) silt loam; moderate, fine to medium, granular structure; friable; many roots; neutral; abrupt, smooth boundary.

A12 (10-17″) Very dark grayish-brown (10YR 3/2) silt loam; moderate, fine to medium, granular structure; friable; many roots; light brownish-gray (10YR 6/2) silt coatings when dry; medium acid; clear, smooth boundary.

B1 (17-24″) Dark brown and dark grayish-brown (10YR 4/3 and 4/2) silt loam; moderate, fine, subangular blocky structure; friable; common roots; patchy, dark brown (10YR 3/3) coatings; light brownish-gray (10YR 6/2) silt coatings when dry; strongly acid; gradual, smooth boundary.

B21 (24-30″) Dark brown and dark yellowish-brown (10YR 4/3 and 4/4) silt loam; few, fine, distinct, grayish-brown (10YR 5/2) and common, fine, distinct, strong brown (7.5YR 5/6) mottles; moderate, fine to medium, subangular blocky structure; friable; few roots; patchy, dark brown (10YR 3/3) coatings; gray (10YR 6/1) silt coatings when dry; medium acid; clear, smooth boundary.

B22 (30-41″) Dark brown and dark yellowish-brown (10YR 4/3 and 4/4) silt loam; few, fine, distinct, grayish-brown (10YR 5/2), common, fine, distinct, yellowish-brown (10YR 5/6), and few, fine, prominent, yellowish-red (5YR 4/6) mottles; moderate, medium, subangular blocky structure; friable; few roots; patchy, dark brown (10YR 3/3) coatings; gray (10YR 6/1) silt coatings when dry; medium acid; gradual, smooth boundary.

B3 (41-46″) Dark yellowish-brown and pale brown (10YR 4/4 and 6/3) silt loam; few, fine, distinct, grayish-brown (10YR 5/2) and common, fine, distinct, strong brown (7.5YR 5/6) and yellowish-red (5YR 4/6) mottles; moderate, coarse, subangular blocky structure; friable; few roots; gray (10YR 6/1) silt coatings when dry; medium acid; gradual, smooth boundary.

C (46-60″) Dark yellowish-brown and pale brown (10YR 4/4 and 6/3) silt loam; common, fine, distinct, grayish-brown (10YR 5/2), strong brown (7.5YR 5/6), and yellowish-red (5YR 4/6) mottles; massive, breaking to weak, coarse, subangular blocky structure; friable; few roots in upper part; slightly acid.

Keltner Series (546)

This series consists of dark-colored, moderately well-drained and well-drained soils that are deep to underlying shale bedrock. These soils occupy moderately sloping to steep upland positions. Most Keltner soils are located in the northern and western parts of the county and are of minor extent. They have formed dominantly in silty loess and partly in the underlying shale bedrock under grass vegetation. In most places Keltner soils are used for growing corn, oats, and hay, but some areas are used for permanent pasture.

Keltner soils are associated with soils derived from a wide variety of parent materials, including loess, glacial drift, and limestone bedrock. In some places Keltner soils lie on the lower portion of slopes where the shale bedrock occurs at lower elevations than limestone bedrock. Where Keltner soils occur with the somewhat poorly drained Loran soils, which have similar parent materials, Keltner soils tend to lie on steeper slopes at slightly higher elevations.

Keltner soils have moderate permeability in the loess, slow permeability in the shale, and moderate to high available water capacity. The most favorable rooting zone extends to about 40 or 50 inches; below this depth the high clay and lime content limits root penetration. Septic tank filter fields are limited because of the slow permeability of the shale bedrock. In some places, septic tank effluent will seep out at the surface of lower slopes. The underlying shale material has a high shrink-swell ratio because of its high clay content.

Because of the low acreage of Keltner soils, some areas are included on the soil map which have a thinner loess cover and thinner profile over the shale bedrock than is characteristic of the series. This is especially true of the very strongly sloping and steep mapping units. In a few places loamy to sandy glacial drift occurs above the shale bedrock.

The mapping units of this soil series are 546C2, 546D2, 546E2, 546E3, and 546F2. The profile described here occurs in an uncultivated area and has a thicker A horizon than most of the Keltner soil mapping units.

Keltner silt loam representative profile (546C2):

A1 (0-8″) Black to very dark grayish-brown (10YR 2/1 to 3/2) silt loam; moderate, very fine, subangular blocky structure; friable; slightly acid; gradual, smooth boundary.

A3 (8-12″) Mixed very dark gray and dark grayish-brown (10YR 3/1 and 4/2) heavy silt loam; many wormcasts; weak to moderate, fine, subangular blocky structure; friable; medium acid; gradual, smooth boundary.

B1 (12-16″) Dark brown (10YR 3/3) light silty clay loam; weak, fine to very fine, subangular blocky structure; firm; medium acid; gradual, smooth boundary.

B21t (16-23″) Brown (10YR 4/3) light silty clay loam; compound weak, medium, prismatic and weak, fine, subangular blocky structure; firm; thin, discontinuous, dark brown (10YR 3/3) clay films; medium acid; gradual, smooth boundary.

B22t (23-31″) Dark grayish-brown to brown (10YR 4/2 to 4/3) silty clay loam; moderate, fine, angular blocky structure; firm; thin, discontinuous, dark brown (10YR 3/3) clay films; neutral; gradual, smooth boundary.

IIB3t (31-40″) Dark grayish-brown to brown (10YR 4/2 to 4/3) silty clay; common to few, fine, distinct, yellowish-brown (10YR 5/8) mottles and common, fine, very dark brown (10YR 2/2) oxide specks; moderate, fine, angular blocky structure; firm; dark grayish-brown (2.5Y 4/2) discontinuous clay films; mildly alkaline; abrupt, smooth boundary.

IIC (40-60″ +) Greenish-gray (5GY 6/1) clay; many, coarse, prominent, brownish-yellow (10YR 6/6) mottles and a dark reddish-gray (10R 4/1) discontinuous layer at top; massive; very firm; moderately alkaline; strong effervescence. This horizon is relatively unaltered, soft, shale bedrock.

Lamont Series (175; 952 or Z With Tell)

The Lamont series consists of light-colored, well-drained soils that are deep to the underlying loose sand. These soils occupy gently sloping to steep slopes on terraces but more commonly occupy upland positions in the southwestern and northwestern parts of the

county. They developed from wind- and water-deposited sandy material under a forest vegetation. The primary use of these soils is for corn, oats, hay, pasture, and timber.

Lamont soils are geographically associated with Bloomfield and Tell soils. In most places Lamont soils occupy gently sloping to steep slopes, as do Bloomfield soils, but Lamont soils are finer textured in the surface and subsoil than Bloomfield soils. Both Lamont and Tell soils occupy gently sloping to steep slopes, but Tell soils are formed from 20 to 40 inches of silty loess material on sand. Where the depth of silty material on the landscape changes greatly within short distances, Lamont and Tell soils are difficult to separate. In these areas they are combined on soil maps to form complex mapping units.

Lamont soils have moderately rapid permeability and low available water capacity. The most favorable rooting zone extends to a depth of about 2 feet. Below this depth is loamy sand or sand that has very low water-holding capacity. Because Lamont soils have moderately rapid permeability, unfiltered sewage from septic tanks can contaminate water supplies. These soils are a good source of sand.

Although most Lamont soils have light-colored surface horizons, some areas included in mapping have as much as 8 or 9 inches of dark A horizon.

Lamont soils occur separately in the following mapping units: 175B, 175C, 175C2, 175D, 175D2, 175D3, 175E2, 175E3, 175F2, and 175F3. Lamont soils occur as a complex with Tell soils in the following mapping units: 952C or ZC, 952C2 or ZC2, 952D2 or ZD2, 952D3 or ZD3, 952E2 or ZE2, 952E3 or ZE3, 952F or ZF, 952F2 or ZF2, and 952F4 or ZF4.

Some of the most severe water erosion in the county occurs in areas of the Tell-Lamont complex. As gullies form they tend to undercut rapidly, increasing in size at a rapid rate if not protected.

Lamont fine sandy loam representative profile (175C):

A1 (0-4″) Dark brown to very dark grayish-brown (10YR 3/3 to 3/2) fine sandy loam; weak, fine, granular structure; very friable; neutral; abrupt, smooth boundary.

A2 (4-8″) Dark grayish-brown and brown (10YR 4/2 and 4/3) fine sandy loam; weak, fine, platy structure; very friable; medium acid; clear, smooth boundary.

B21t (8-15″) Dark brown (7.5YR 4/4) fine sandy loam to loam; weak, fine, subangular blocky structure; friable; some clay coatings on sand grains; medium acid; clear, smooth boundary.

B22t (15-25″) Brown (7.5YR 5/4) heavy fine sandy loam; weak, fine and medium, subangular blocky structure; friable; few clay coatings on sand grains; medium acid; clear, smooth boundary.

B3 (25-30″) Strong brown (7.5YR 4/6) fine sandy loam; weak, fine, subangular blocky structure; very friable; medium acid; gradual, smooth boundary.

C1 (30-40″) Strong brown (7.5YR 4/6) fine sandy loam to loamy fine sand; single grained; loose; medium acid; gradual, smooth boundary.

C2 (40-60″ +) Yellowish-brown and dark yellowish-brown (10YR 5/4 and 4/4) loamy fine sand to fine sand; single grained; loose; slightly acid. A few lenses or lamellae of strong brown (7.5YR 4/6) ¼ to 1 inch thick occur above 60 inches. These have loamy fine sand texture.

Lawson Series (451)

This series contains dark-colored, deep soils that are somewhat poorly drained. These soils lie on nearly level bottomlands or flood plains in the eastern and southern portions of the county and are very extensive. Lawson soils have formed in silty, waterlaid sediments derived primarily from upland areas which developed under grass vegetation. Corn is the main crop grown on Lawson soils. Some areas are maintained as pastureland.

Lawson soils are associated mainly with Dorchester and Sawmill soils. Lawson and Dorchester soils occupy similar, nearly level floodplain positions, but Dorchester soils are calcareous and in most places lighter colored. In most areas Lawson soils occupy slightly higher, nearly level floodplain positions adjacent to the depressional silty clay loam Sawmill soils. Other commonly associated soils are Otter, Orion, and Huntsville.

Lawson soils are moderately permeable and have very high available water capacity. Because the water table is high during a part of the year, Lawson soils are limited for septic tank filter fields. This is especially true of the wet mapping unit.

The two mapping units for the Lawson series are 451 and 451.

Lawson silt loam representative profile (451):

A11 (0-7″) Very dark grayish-brown (10YR 3/2) silt loam; moderate, medium to coarse, granular structure; friable; many roots; mildly alkaline; clear, smooth boundary.

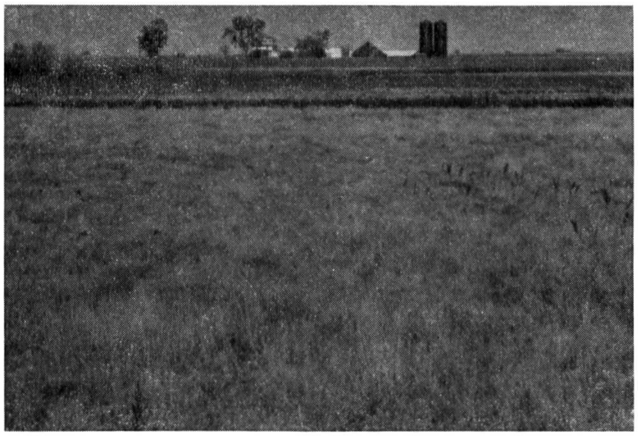
A12 (7-40″) Black (10YR 2/1) silt loam; moderate, medium to coarse, granular structure; friable; many roots; mildly alkaline; clear, smooth boundary.

A13 (40-56″) Black and very dark gray (10YR 2/1 and 3/1) heavy silt loam; few, fine, faint, dark brown (7.5YR 4/4) mottles; weak, coarse, subangular and angular blocky structure; friable; common roots; mildly alkaline; clear, smooth boundary.

Cg (56-70″ +) Very dark gray and some dark gray (10YR 3/1 and 4/1) silt loam with some sand grading to loam; common, fine, distinct, dark red (2.5YR 3/6) and yellowish-red (5YR 5/6) mottles; massive; mildly alkaline; slight effervescence.

Lena Series (210)

The Lena series consists of deep, dark-colored organic soils that are very poorly drained. These soils occupy depressional and nearly level areas, usually in bottomland positions, and have formed under a native vegetation of water-loving grasses such as reeds and rushes. The organic material averages greater than 50 inches thick and contains many snail shells. These soils are primarily used for corn or pasture.



Lena muck, a Histosol developed in organic-matter parent material, occupies the foreground. The farmstead is on Tama silt loam, about a mile west of Milledgeville. (Fig. 15)

Lena soils are geographically associated with Lawson, Otter, and other bottomland soils. They often occur in very wet depressional areas in the bottoms and sometimes at the edges of alluvial areas where seepage water or springs maintain a wet environment.

Lena soils have moderate permeability and very high available water capacity. They are naturally high in lime, and the availability of phosphorus is reduced. Lena soils are limited for septic tank filter fields and basements because they occur in landscape positions which have a seasonally high water table. Because these soils are high in organic matter and low in mineral matter, they possess low bearing strength. Lena soils may serve as a source of high organic content material for topdressing and soil conditioning.

Included in mapping are a few areas of calcareous muck that have mineral material between 3 and 5 feet.

The mapping units for this series are 210 and 210.

Lena muck representative profile (210):

Oa1 (0-12″) Black (N 2/0) muck with low fiber content; weak, fine and medium, subangular blocky structure; very friable; contains occasional snail shells and fragments; moderately alkaline; strong effervescence; clear, smooth boundary.

Oa2 (12-30″) Black (N 2/0) muck with low fiber content, but more than horizon above; weak, coarse, subangular blocky structure; very friable; contains many snail shells and fragments; moderately alkaline; strong effervescence; gradual, smooth boundary.

Oa3 (30-60″ +) Black (N 2/0) with some dark brown (7.5YR 3/3) muck with about 15 percent fiber; massive; very friable; contains snail shells and fragments; moderately alkaline; strong effervescence.

Littleton Series (81)

The Littleton series consists of deep, dark-colored soils which are somewhat poorly drained. These soils occupy nearly level to moderately sloping stream terrace benches or silty outwash areas and some colluvial areas near the base of steep upland slopes. They are located mainly in the western part of the county, but some small areas lie adjacent to narrow upland drainageways in other parts of the county. Littleton soils have formed in silty material, mainly water deposited, under native prairie vegetation. These soils are used mainly for growing corn, oats, and hay.

Littleton soils are frequently associated with Worthen soils. Littleton soils are less well drained than Worthen soils and, in most places, occupy lower positions on the landscape. Littleton soils also occur with a wide variety of other terrace and alluvial soils.

Littleton soils are moderately permeable and have very high available water capacity. They are limited for septic tank filter fields and basements because their landscape positions often have a seasonally high water table.

Included in the mapping of these soils are a few areas with stronger B horizon development or more clay than normal. In the western half of Section 19, T24N, R4E, some of the Littleton areas have limestone bedrock at less than 5 feet.

The three mapping units of the Littleton series are 81A, 81B, and 81C.

Littleton silt loam representative profile (81A):

A11 (0-16″) Black (10YR 2/1) silt loam; moderate, fine, granular structure; friable; neutral; clear, smooth boundary.

A12 (16-22″) Very dark brown (10YR 2/2) silt loam; moderate, medium to coarse, granular structure; friable; slightly acid; clear, smooth boundary.

A3 (22-30″) Very dark brown and dark brown (10YR 2/2 and 3/3) silt loam; weak, medium, granular structure; friable; slightly acid; clear, smooth boundary.

B2 (30-43″) Mixed very dark grayish-brown and dark grayish-brown (10YR 3/2 and 4/2) silt loam; common, medium, faint, grayish-brown (10YR 5/2) and common, fine, distinct, yellowish-red (5YR 4/6) mottles; weak, medium, subangular blocky structure; friable; slightly acid; gradual, smooth boundary.

C (43-60″ +) Dark grayish-brown (10YR 4/2) silt loam; common, medium, faint, grayish-brown (10YR 5/2) and common, fine, distinct, yellowish-red (5YR 4/6) mottles; massive, with slight tendency to break into coarse, subangular blocky structure in upper few inches; very friable; few black iron-manganese stains; neutral.

Loran Series (572)

The Loran series are dark, somewhat poorly drained soils that are deep to shale bedrock. These are moderately sloping to strongly sloping upland soils and they do not occur extensively. Loran soils are located mainly north of Lanark near the county line and in the vicinity of Wacker. These soils have formed mostly in silty loess and partly in the underlying shale bedrock. The native vegetation of these soils was prairie grasses. In Carroll County Loran soils are used mainly for growing corn, oats, and hay.

Loran soils are geographically associated with soils developed in a wide range of parent materials including loess, glacial drift, and limestone bedrock. In some places Loran soils occupy footslope positions along drainageways adjacent to the better drained Keltner and Eleroy or Derinda soils. Keltner soils are developed from similar parent materials but have better natural drainage than Loran soils. Eleroy and Derinda soils have formed under forest vegetation.

Loran soils are moderately slowly permeable and have high available water capacity. The most favorable rooting zone extends to about 40 or 50 inches; below this depth, the high clay and lime content limit root penetration. Septic tank filter fields are limited because the permeability is moderately slow. In some places septic tank effluent will seep out at the surface on lower slopes. The lower part of the subsoil and the underlying shale have a high shrink-swell ratio because of the high clay content.

Most areas of Loran soils are similar to the representative profile described here, but some areas are poorly drained and have silty clay loam surface textures, and some units northwest of Wacker have silt loam B horizons.

The mapping units shown on the soil map are 572C, 572D, and 572D2.

Loran silt loam representative profile (572C):

Ap (0-7″) Black (10YR 2/1) silt loam; moderate, fine to medium, granular structure; friable; slightly acid; abrupt, smooth boundary.

A3 (7-11″) Very dark grayish-brown (10YR 3/2) silt loam; moderate, medium, granular structure; friable; neutral; clear, smooth boundary.

B1 (11-16″) Mixed dark grayish-brown, brown, and grayish-brown (10YR 4/2, 4/3, and 5/2) light silty clay loam; moderate, very fine and fine, subangular blocky structure; firm; neutral; clear, smooth boundary.

B21t (16-28″) Dark grayish-brown and brown (10YR 4/2 and 4/3) silty clay loam with few, medium, distinct, grayish-brown (2.5Y 5/2) and common, fine, prominent, yellowish-brown (10YR 5/8) mottles; moderate, fine, subangular blocky structure; firm; discontinuous, dark grayish-brown (2.5Y 4/2) clay films; few iron-manganese concretions; neutral; clear, smooth boundary.

B22t (28-44″) Grayish-brown (10YR 5/2) silty clay loam with few, medium, distinct, grayish-brown (2.5Y 5/2) and gray (10YR 5/1) and few, fine, prominent, yellowish-brown (10YR 5/8) mottles; moderate, fine to medium, subangular blocky structure; firm; discontinuous, dark grayish-brown (2.5Y 4/2) clay films; few iron-manganese concretions; neutral; clear, smooth boundary.

IIB3tg (44-48″) Grayish-brown (2.5Y 5/2) and greenish-gray (5G 5/1) silty clay to clay; moderate, medium, subangular and angular blocky structure; very firm; mildly alkaline; clear, smooth boundary.

IICg (48-60″ +) Greenish-gray (5G 6/1) clayey shale bedrock with lenses of yellowish-brown (10YR 5/4) loamy soft dolomitic bedrock; massive to weak, coarse, angular blocky structure; extremely firm; moderately alkaline; strong effervescence.

Millington Series (82)

The Millington series is made up of deep, dark-colored soils that are poorly drained. These soils occupy nearly level and depressional bottomlands. Millington soils have formed in silty and loamy waterlaid sediments under native water-loving grasses. These soils occur in small, scattered delineations and are not restricted to any particular part of Carroll County. They are inextensive. Millington soils are used for growing corn, oats, hay, and permanent pasture.

Millington soils are geographically associated with Otter and Dorchester soils. In most places Millington soils and Otter soils lie in depressional bottomland positions. Millington soils, in most areas, lie adjacent to the better drained, nearly level Dorchester soils that occupy slightly higher bottomland positions. Lawson soils are associated with Millington in some areas.

These soils are moderately permeable and have high available water capacity. Because Millington soils have high lime content, the availability of phosphorus tends to be low. Millington soils are limited for septic tank filter fields and basements because they have a seasonally high water table.

A few areas of Millington soils, such as the area in Section 36, T23N, R3E, have silty clay loam surface textures.

The mapping units in Carroll County are 82 and 82.

Millington silt loam representative profile (82):

Ap (0-10″) Very dark brown (10YR 2/2) silt loam; moderate, fine to medium, granular structure; friable; moderately alkaline; violent effervescence; abrupt, smooth boundary.

A12 (10-30″) Black (N 2/0) heavy silt loam to loam; moderate, fine and medium, subangular blocky structure; friable; moderately alkaline, containing abundant light gray (10YR 6/1) snail shells and fragments; violent effervescence; clear, smooth boundary.

Bg (30-57″) Dark gray (10YR 4/1) loam with some gravel; weak, medium to coarse, subangular blocky structure; friable; moderately alkaline, containing abundant light gray (10YR 6/1) snail shells and lime concretions; violent effervescence; abrupt, wavy boundary.

Cg (57-65″ +) Grayish-brown (2.5Y 5/2) silt loam to loam; many, medium, distinct, yellowish-brown (10YR 5/6) mottles; massive; friable; mildly alkaline; slight effervescence.

Mixed Alluvial Land (455)

Mixed Alluvial Land is a land type that includes a wide variety of bottomland soils, mostly areas with poor accessibility. This land type has its major occurrence on islands in the Mississippi River which are primarily government owned and part of the Upper Mississippi River Wildlife and Fish Refuge.

Most areas are nearly level or gently sloping. This land type ranges from light to dark surface color, clay loam to loamy sand texture, and slightly acid to mildly alkaline reaction. On the basis of known characteristics of observed bottomland soils adjacent

to the Mississippi River, most areas of this land type can be predicted to be moderately dark to dark colored, silt loam or loam textured, and neutral or mildly alkaline. Many areas have a high water table, but natural drainage is variable. Permeability and available water capacity are also variable.

Many areas, especially islands in the Mississippi River, support forest vegetation. Better drained sites support soft maple, elm, ash, and occasionally oak trees. Wetter sites support cottonwood, poplar, and willow. Dead trees stand in some places as a result of tree kill when water tables were raised by the series of dams on the Mississippi River.

Some areas are included in this land type which are accessible and occasionally cultivated or pastured. These occur in the flood plains and as fans of the small streams that drain the uplands of the southwestern part of Carroll County where sandy soils and loess over sandy soils are important. The Mixed Alluvial Land areas here are primarily moderately dark- and light-colored sandy and loamy overwash of variable thickness over silt loam or silty clay loam sediments. These areas tend to have better natural drainage than the Mixed Alluvial Land nearer the Mississippi River. The sediments in the flood plain of Sand Creek, which flows into Johnson Creek, are representative of this portion of the land type.

The mapping unit for this land type is 455. Because of the great degree of variability, no representative profile is given for this unit. Areas which are unprotected from flooding and flood periodically are best suited as habitat for wildlife.

Mt. Carroll Series (268)

The Mt. Carroll series consists of deep, moderately dark-colored soils that are well and moderately well drained. These are gently sloping to strongly sloping soils of upland areas, primarily in Mt. Carroll (T24N, R4E) and York (T23N, R4E) Townships. They formed in greater than 5 feet of loess under a mixed grass and forest vegetation. They have weakly developed silt loam B2 horizons. These soils are primarily used for corn, oats, and hay.

Mt. Carroll soils are associated with Port Byron and Seaton soils. In many places Mt. Carroll soils occur between Port Byron soils, which were formed under grass vegetation, and Seaton soils, which were formed under a forest cover.

Mt. Carroll soils have moderate permeability and a very high available water capacity. Because Mt. Carroll soils have favorable permeability, they are suited for building level terraces for erosion control. These soils are limited for ponds and lakes because they do not contain sufficient clay for adequate compaction.

The mapping units shown on the soil map are 268B, 268C, 268C2, and 268D2.

Mt. Carroll silt loam representative profile (268B):

Ap (0-6″) Very dark grayish-brown (10YR 3/2) silt loam; moderate, fine to medium, granular structure; friable; many roots; light gray (10YR 7/2) silt coatings when dry; neutral; abrupt, smooth boundary.

A12 (6-9″) Very dark grayish-brown (10YR 3/2) with small amount of dark grayish-brown (10YR 4/2) silt loam; moderate, fine to medium, granular structure; friable; many roots; light gray (10YR 7/2) silt coatings when dry; neutral; clear, smooth boundary.

A21 (9-12″) Dark grayish-brown (10YR 4/2) with some very dark grayish-brown (10YR 3/2) silt loam; moderate, thin to medium, platy structure; friable; many roots; light gray (10YR 7/2) silt coatings when dry; neutral; abrupt, smooth boundary.

A22 (12-16″) Brown (10YR 5/3) silt loam with some very dark grayish-brown (10YR 3/2) wormcasts; moderate, thin to medium, platy structure; friable; many roots; white (10YR 8/2) silt coatings when dry; slightly acid; clear, smooth boundary.

B1 (16-22″) Dark brown and yellowish-brown (10YR 4/3 and 5/6) silt loam; moderate, fine to medium, subangular blocky structure; friable; common roots; white (10YR 8/2) silt coatings when dry; medium acid; gradual, smooth boundary.

B21t (22-33″) Dark yellowish-brown (10YR 4/4) silt loam; moderate, medium, subangular blocky structure; friable; few roots; few dark brown (10YR 3/3) clay films; white (10YR 8/2) silt coatings when dry; strongly acid; gradual, smooth boundary.

B22t (33-41″) Dark yellowish-brown and yellowish-brown (10YR 4/4 and 5/4) silt loam; moderate, medium, subangular blocky structure; friable; few roots; few dark brown (10YR 3/3) clay films; white (10YR 8/2) silt coatings when dry; medium acid; gradual, smooth boundary.

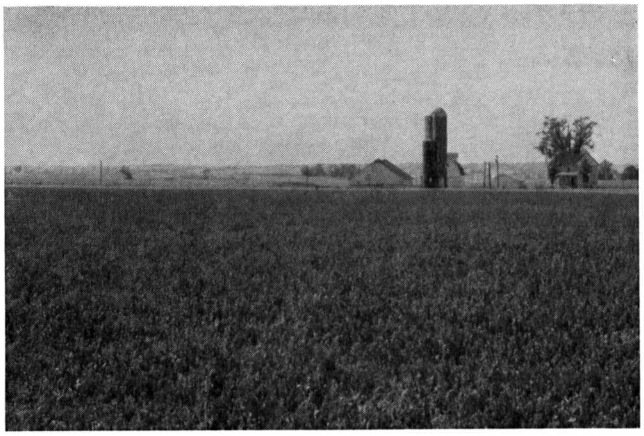
B3 (41-46″) Brown and yellowish-brown (10YR 5/3 and 5/4) silt loam; few, fine, distinct, strong brown (7.5YR 5/6) mottles; weak, medium to coarse, subangular to angular blocky structure; friable; few roots; few dark brown (7.5YR 3/2) clay films; white (10YR 8/2) silt coatings when dry; medium acid; gradual, smooth boundary.

C (46-60″ +) Dark brown, brown, and yellowish-brown (10YR 4/3, 5/3, and 5/4) silt loam; common, medium, distinct, strong brown (7.5YR 5/6) mottles; massive, breaking to weak, coarse, subangular and angular blocky structure; friable; few roots in upper part; slightly acid.

Muscatine Series (41)

The Muscatine series consists of deep, dark-colored soils that are somewhat poorly drained. These soils occupy nearly level to gently sloping terrace benches and uplands, mainly in the eastern one-half of Carroll County. Muscatine soils have formed in more than 5 feet of loess under native prairie grasses. Most areas of these soils are cultivated and are used primarily for growing corn and soybeans.

Muscatine soils are associated primarily with Tama and Sable soils. They occupy intermediate landscape positions adjacent to the more sloping and better drained Tama soils and the depressional, poorly drained Sable soils.



Nearly level Muscatine and Tama soils (shown in foreground) are some of the most productive upland soils in Carroll County. (Fig. 16)

Muscatine soils are moderately permeable and have very high available water capacity. They are limited for septic tank filter fields and basements because they have a seasonally high water table.

A few small areas included in mapping have slightly less than 5 feet of loess.

The two mapping units that occur in Carroll County are 41A and 41B.

Muscatine silt loam representative profile (41A):

A11 (0-14″) Black (10YR 2/1) silt loam to silty clay loam; moderate, medium to coarse, granular structure; friable; many roots; strongly acid; gradual, smooth boundary.

A12 (14-18″) Black (10YR 2/1) light silty clay loam; moderate, coarse, granular to fine, subangular blocky structure; friable; many roots; strongly acid; clear, smooth boundary.

A3 (18-21″) Black (10YR 2/1) light silty clay loam; moderate, fine, subangular blocky structure; friable; common roots; grayish-brown (10YR 5/2) silt coatings when dry; strongly acid; clear, smooth boundary.

B21t (21-27″) Dark grayish-brown (10YR 4/2) silty clay loam; few, fine, distinct, yellowish-brown (10YR 5/4) mottles; moderate, fine to medium, subangular blocky structure; friable; common roots; thin clay films; grayish-brown (10YR 5/2) silt coatings when dry; worm channel fillings of very dark grayish brown (10YR 3/2); few, fine, iron-manganese concretions; strongly acid; clear, smooth boundary.

B22t (27-36″) Brown (10YR 5/3) silty clay loam; few, medium, distinct, yellowish-brown (10YR 5/8) mottles; moderate, fine to medium, subangular blocky structure; firm; few roots; dark gray (10YR 4/1) clay films; many, fine, iron-manganese concretions; strongly acid; gradual, smooth boundary.

B23t (36-41″) Grayish-brown and brown (10YR 5/2 and 5/3) silty clay loam; many, medium, distinct, yellowish-brown (10YR 5/8) and strong brown (7.5YR 5/8) mottles; weak, medium, subangular blocky structure; friable; few roots; few, thin, clay films; many, fine, iron-manganese concretions; strongly acid; clear, smooth boundary.

B3 (41-55″) Mixed gray, light brownish-gray, yellowish-brown (10YR 6/1, 6/2, 5/4, and 5/8) and strong brown (7.5YR 5/8) light silty clay loam; weak, coarse, angular blocky structure; friable; many, fine, iron-manganese concretions; slightly acid; clear, smooth boundary.

C (55-70″ +) Mixed gray, light brownish-gray, yellowish-brown, dark yellowish-brown (10YR 6/1, 6/2, 5/6, 5/8, and 3/4), and strong brown (7.5YR 5/8) silt loam; massive; friable; few, fine, iron-manganese concretions; slightly acid to neutral.

Myrtle Series (414)

The Myrtle series consists of deep, moderately dark-colored soils that are well drained. These are gently sloping to strongly sloping upland soils located primarily in the eastern part of the county. They have formed partly in silty loess and partly in underlying loamy glacial till or drift under a mixed grass and forest vegetation. Loess thickness is normally 30 to 50 inches. These soils are used primarily for corn, oats, and hay.

Myrtle soils are associated with Argyle, Downs, Pecatonica, and Tama soils. Myrtle soils in some places occupy landscape positions between more sloping Argyle and less sloping Downs soils. Myrtle soils formed partly in loess and partly in drift, but Argyle soils formed mostly in drift and Downs soils formed entirely in loess. Pecatonica soils may occur on adjacent, more strongly sloping areas that were forested. Where Myrtle soils border areas developed under grass vegetation, they are associated with Tama soils.

Myrtle soils have moderate permeability and a very high to high available water capacity.

The mapping units shown on the soil map are 414B, 414C, 414C2, and 414D2.

Myrtle silt loam representative profile (414C):

Ap (0-8″) Black (10YR 2/1) silt loam; moderate, fine to medium, granular structure; friable; many roots; medium acid; abrupt, smooth boundary.

A2 (8-13″) Dark grayish-brown (10YR 4/2) silt loam; weak, thin, platy structure; friable; common roots; light gray (10YR 7/1) silt coatings when dry; very dark gray (10YR 3/1) worm channel fillings; medium acid; clear, smooth boundary.

B1 (13-23″) Dark brown and dark yellowish-brown (10YR 4/3 and 4/4) light silty clay loam; moderate, fine, subangular blocky structure; friable; common roots; thin dark brown to brown (7.5YR 4/2) clay films; light gray (10YR 7/1) silt coatings when dry; strongly acid; clear; smooth boundary.

B21t (23-33″) Dark brown (10YR 4/3) silty clay loam; strong, fine to medium, subangular blocky structure; firm; few roots; thin, continuous, dark brown to brown (7.5YR 4/2) clay films; light gray (10YR 7/1) silt coatings when dry; very strongly acid; clear, smooth boundary.

B22t (33-40″) Dark yellowish-brown (10YR 4/4) silty clay loam; strong, fine to medium, subangular and angular blocky structure; firm; few roots; continuous, dark brown to brown (7.5YR 4/2) clay films; light gray (10YR 7/1) silt coatings when dry; very strongly acid; abrupt, smooth boundary.

IIB23t (40-75″) Dark red (2.5YR 3/6) and yellowish-red (5YR 4/6) gravelly clay loam to sandy clay loam; moder-

ate, coarse, subangular and angular blocky structure; firm; few roots; discontinuous, reddish-brown (5YR 4/3) clay films; fine, black (10YR 2/1) iron-manganese stains; medium acid. Grades to loamy sand, then to sand and gravel with depth. Contains zones of carbonates at 80 inches; C horizon with strong effervescence at 100 inches.

Niota Series (261)

The Niota series consists of moderately dark-colored, deep, poorly drained soils. They are the nearly level to depressional soils on lacustrine terraces, high in clay content, and important along the Plum River in the northwestern part of the county. They formed partly from silty material, probably loess, but mostly from the underlying high-clay, lacustrine deposits under a grassland or mixed grass-forest vegetation. Niota soils are used primarily for growing corn, oats, and hay.

Niota soils are geographically associated with Niota, clayey subsurface variant soils; Zwingle soils; and the Terrace Escarpments land type. In some places, Niota soils occupy nearly level to depressional positions similar to the clayey subsurface variant soils, but Niota has a surface layer formed in silty material, including an A2 horizon, while the surface layer of the variant consists of clayey material. In other places, Niota soils lie on the nearly level to depressional, lacustrine terrace benches near or adjacent to short and steep lacustrine Terrace Escarpments.

Niota soils have very slow permeability and moderate available water-holding capacity. The high clay content of the lacustrine parent material below the surface horizons has an adverse effect on root penetration. Because Niota soils have very slow permeability, they are limited for septic tank filter fields. The high clay content causes Niota soils to have a high shrink-swell potential and low bearing strength.

Areas that are mapped as Niota silt loam vary considerably in surface color and organic matter content. A few areas have silty clay loam surface textures. Some areas lack the red colors of the representative profile and are developed entirely in gray-colored lacustrine sediments.

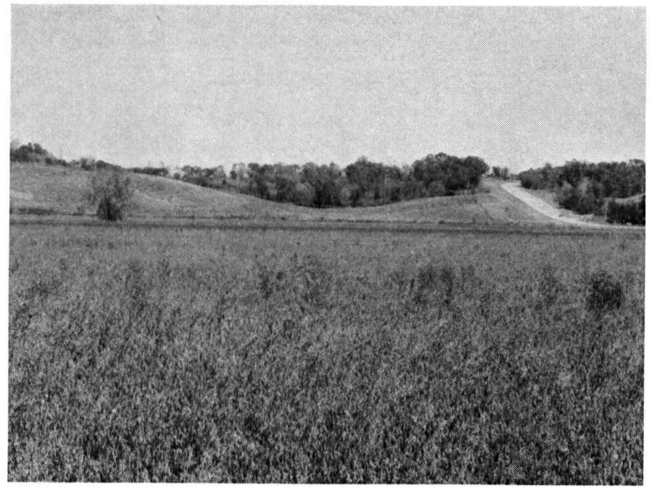
Only one mapping unit occurs: 261.

Niota silt loam representative profile (261):

Ap (0-9″) Very dark grayish-brown (10YR 3/2) silt loam; few, fine, distinct, yellowish-red (5YR 4/8) stains or mottles; moderate, fine to medium, granular structure; friable; common roots; neutral; abrupt, smooth boundary.

A2 (9-17″) Pale brown and light brownish-gray (10YR 6/3 and 6/2) silt loam; common, fine, distinct, yellowish-brown and brownish-yellow (10YR 5/8 and 6/8) mottles; weak, medium to coarse, platy structure breaking to fine, crumb structure; friable; common roots; white (10YR 8/2) coatings when dry; medium acid; clear, smooth boundary.

B1t (17-20″) Grayish-brown and brown (10YR 5/2 and 5/3) heavy silty clay loam; few, fine, distinct, yellowish-brown (10YR 5/8) and yellowish-red (5YR 5/8) mottles; strong, very fine to fine, subangular blocky structure; firm; common roots; few dark gray (10YR 4/1) clay films; white (10YR 8/2) silt coatings when dry; few black iron-manganese concretions; very strongly acid; abrupt, smooth boundary.



Niota soils on the level Plum River terrace area in foreground; light-colored, deep loess soils in the sloping upland. Area is just east of Savanna's Old Mill Park, and highway at right is U.S. 52 and Ill. Rt. 64. (Fig. 17)

IIB21t (20-27″) Mixed reddish-brown (5YR 4/4) and grayish-brown (10YR 5/2) silty clay to clay; few, medium, distinct, yellowish-red (5YR 4/6) mottles; strong, fine to medium, subangular and angular blocky structure; very firm; few roots; discontinuous, dark gray (10YR 4/1) clay films; few white (10YR 8/2) silt coatings when dry; many black iron-manganese concretions; very strongly acid; clear, smooth boundary.

IIB22t (27-43″) Mainly reddish-brown (5YR 4/3 and 4/4) with small amount of grayish-brown and brown (10YR 5/2 and 5/3) clay; strong, medium, angular blocky structure; very firm; few roots along structure joints; distinct, reddish-gray (5YR 5/2) clay films; many black iron-manganese concretions; very strongly acid; clear, smooth boundary.

IIB23t (43-49″) Mixed reddish-brown (2.5YR 4/4 and 5YR 5/3) and grayish-brown (10YR 5/2) clay; moderate, medium, prismatic breaking to coarse, subangular and angular blocky structure; very firm; reddish-gray (5YR 5/2) clay films; many black iron-manganese concretions; slightly acid; gradual, smooth boundary.

IIC (49-60″ +) Mixed reddish-brown (5YR 4/3 and 5/3) and brown (10YR 5/3) clay; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; massive, with some breaking to coarse, angular blocky structure; few black iron-manganese concretions; common, soft, pale brown and white lime concretions; moderately alkaline; slight effervescence. Below 60 inches material is stratified grayish-brown silty clay loam and reddish-brown clay.

Niota, Clayey Subsurface Variant (568)

This variant of the Niota series is made up of deep, dark-colored soils that are very poorly drained. These soils occupy nearly level to gently sloping terrace benches in the northwestern portion of the county. Niota, clayey subsurface soils have formed dominantly

in clayey (lacustrine) material under water-loving grass vegetation. They differ from the Niota series in having more clay in the surface and lacking an A2 horizon. They are wetter than Niota soils and lack evidence of clay movement into the B horizon. These soils are used mainly for growing corn, oats, and hay.

Niota, clayey subsurface soils are geographically associated with the Niota and Zwingle soils and the steep, lacustrine Terrace Escarpments. In most places Niota, clayey subsurface soils and Niota soils occupy nearly level to depressional positions. The clayey subsurface soils have clayey surface and subsurface layers (lacustrine), while Niota soils have a silty surface layer, including an A2 horizon, above the clayey sediments. In other places these soils lie on nearly level to depressional lacustrine terrace benches near or adjacent to the short Terrace Escarpments.

Niota, clayey subsurface soils are very slowly permeable and have moderate available water capacity. The high clay content is not conducive to good root penetration and branching, although roots can follow the structure joints in the clay to some extent. Because these soils are very slowly permeable, they are limited for septic tank filter fields and tile drainage. The high clay content causes them to have a high shrink-swell ratio and low bearing strength.

Some areas included with Niota, clayey subsurface soils do not have A horizons as dark or as thick as described here.

The two mapping units shown on the soil map are 568A and 568B.

Niota silty clay loam, clayey subsurface variant representative profile (568A):

Ap (0-9″) Black to very dark brown (10YR 2/1 to 2/2) silty clay loam; moderate, medium to fine, granular structure; firm; common roots; neutral; abrupt, smooth boundary.

B21g (9-17″) Gray (10YR 5/1) silty clay loam to silty clay; many, fine, distinct, strong brown (7.5YR 5/8) mottles; some root channels and krotovina of very dark brown (10YR 2/2); moderate, fine, angular blocky structure; firm; common roots; very strongly acid; clear, smooth boundary.

B22g (17-31″) Grayish-brown (10YR 5/2) silty clay; common, fine, distinct, brownish-yellow and yellowish-brown (10YR 6/8 and 5/8) mottles; some root channels and krotovina of very dark brown (10YR 2/2); weak, fine to medium, angular blocky structure; very firm; few roots; few iron-manganese concretions; strongly acid; clear, smooth boundary. Horizon contains a 2-inch diagonal band of reddish-brown (5YR 5/3) clay.

C1g (31-62″) Stratified grayish-brown and light brownish-gray (10YR 5/2 and 6/2) silty clay loam and reddish-brown (2.5YR 4/4 and 5YR 5/3) silty clay to clay; massive, with tendency to break into weak, coarse, angular blocky structure; friable to extremely firm; few roots in upper part; few iron-manganese concretions; neutral to mildly alkaline; clear, smooth boundary.

C2 (62-72″ +) Mixed brown (10YR 5/3), light gray to gray (10YR 6/1), and dark brown (7.5YR 4/4) silt loam; massive; friable; moderately alkaline; slight effervescence.

Ogle Series (412)

The Ogle series consists of deep, dark-colored soils that are well drained. These soils occur in the upland on moderately sloping to very strongly sloping sites, primarily in the eastern one-third of the county. They have formed partly in silty loess and partly in the underlying sandy or loamy glacial till or drift under native grass vegetation. Loess is usually 30 to 50 inches thick. These soils are used primarily for corn, oats, and hay.

Ogle soils are geographically associated with Durand and Tama soils. Ogle soils in some places occupy landscape positions between the more sloping Durand and the less sloping Tama soils; in other areas they may occur over similar slope ranges. Ogle soils formed partly in loess and partly in drift. Durand soils formed mostly in drift. Tama soils formed entirely in loess.

Ogle soils have moderate permeability and a high to very high available water capacity.

The mapping units that occur in Carroll County are 412C, 412C2, 412D2, 412D3, and 412E2.

Ogle silt loam representative profile (412C):

A1 (0-11″) Very dark brown (10YR 2/2) silt loam; moderate, fine, granular structure; friable; slightly acid; gradual, smooth boundary.

A3 (11-15″) Dark brown (10YR 3/3) heavy silt loam; moderate, very fine, subangular blocky structure; friable; abundant wormcasts of very dark brown (10YR 2/2); medium acid; gradual, smooth boundary.

B21t (15-22″) Dark brown (10YR 4/3) light silty clay loam; moderate, fine, subangular blocky structure; firm; few very dark grayish-brown (10YR 3/2) wormcasts; occasional fine gray to light gray (10YR 6/1) specks on ped surfaces when dry; strongly acid; gradual, smooth boundary.

B22t (22-33″) Dark yellowish-brown (10YR 4/4) silty clay loam; moderate, fine and medium, subangular blocky structure; firm; few, thin, discontinuous, dark brown (7.5YR 3/4) clay films; medium acid; gradual, smooth boundary.

B23t (33-40″) Yellowish-brown (10YR 5/4) light silty clay loam; moderate, medium, subangular blocky structure; firm; thin, patchy, dark brown (7.5YR 3/4) clay films; few sand grains and angular pebbles in lower portion; medium acid; clear, smooth to wavy boundary.

IIB24t (40-65″ +) Reddish-brown (5YR 4/4) clay loam; strong, medium and coarse, blocky structure; firm; thick, continuous, dark reddish-brown (5YR 3/4) clay films; medium acid.

Ogle, Silt Loam Subsoil Variant (574)

This variant of the Ogle series is made up of dark-colored, deep soils that are well drained. These soils occupy gently and moderately sloping upland landscape positions in the southwest part of the county. They have formed partly in silty loess and partly in underlying loamy glacial till or drift under grass vegetation. This variant differs from the Ogle soils in having a more weakly developed silt loam B2 hori-

zon in the loess part of the profile. Loess is usually 30 to 50 inches thick. Corn, oats, and hay are the main crops grown on these soils.

Ogle, silt loam subsoil variant soils are associated with Port Byron soils and Port Byron, sandy substratum soils. These soils and Port Byron soils occupy similar upland landscape positions. The Ogle, silt loam subsoil variant soils are formed partly in silty loess and partly in underlying loamy glacial drift. Port Byron soils are formed entirely in silty loess, and the sandy substratum phase has developed in 40 to 60 inches of loess over sand.

These soils have moderate permeability and very high to high available water capacity.

The two mapping units of this variant are 574B and 574C.

Ogle silt loam, silt loam subsoil variant representative profile (574B):

A1 (0-9") Very dark brown (10YR 2/2) silt loam; moderate, fine to medium, granular structure; friable; many roots; slightly acid; clear, smooth boundary.

A3 (9-14") Very dark grayish-brown (10YR 3/2) silt loam; weak, fine, subangular blocky structure; friable; common roots; medium acid; clear, smooth boundary.

B1 (14-23") Dark yellowish-brown (10YR 3/4) silt loam; weak, fine to medium, subangular blocky structure; friable; common roots; few silt coatings of light gray (10YR 7/1) when dry; strongly acid; gradual, smooth boundary.

B21 (23-30") Dark yellowish-brown (10YR 4/4) silt loam; weak, medium, subangular blocky structure; friable; common roots; few silt coatings of light gray (10YR 7/1) when dry; strongly acid; gradual, smooth boundary.

B22 (30-36") Dark brown (7.5YR 4/4) silt loam with noticeable sand; weak, medium to coarse, subangular blocky structure; friable; few roots; strongly acid; clear, smooth boundary.

IIB23t (36-60" +) Reddish-brown (5YR 4/4) clay loam; moderate to weak, coarse, subangular and angular blocky structure; firm; few roots in upper part; discontinuous, dark reddish-brown (5YR 3/4) clay films; few light brown (7.5YR 6/4) silt coatings; medium acid in upper part, slightly acid in lower part. II material, till or drift, is weathered to dolomitic limestone, which occurs at about 90 inches.

Onarga, Reddish Subsoil Variant (673)

This variant of the Onarga series consists of deep, dark-colored soils which are well drained. These soils occupy gentle slopes on the sandy terraces in the southwestern part of Carroll County and are not extensive. These soils have developed in sandy deposits under native prairie vegetation. They are used mainly for growing corn, oats, and hay.

Onarga, reddish subsoil variant soils are associated with Dickinson and other sandy soils. These Onarga variant soils have more clay in the B horizon than Dickinson soils.

These soils have rapid to moderately rapid permeability in the upper part of the solum and moderate permeability in the lower B horizon. They have moderate available water capacity.

This variant of Onarga is believed to have developed in two different parent materials. The IIB and IIC horizons are redder (5YR hue) and contain more clay than the material above and thus differ from the regular Onarga soils (not mapped in Carroll County). Recently, a new soil series, Coyne, has been established in the Rock Island County, Illinois, soil survey. The Onarga, reddish subsoil variant of Carroll County, mapped in only a little more than 200 acres, has characteristics very similar to the Coyne series.

The only mapping unit of Onarga, reddish subsoil variant is 673B.

Onarga fine sandy loam, reddish subsoil variant representative profile (673B):

A1 (0-10") Very dark brown (10YR 2/2) fine sandy loam; weak, fine, granular structure; very friable; many roots; neutral; clear, smooth boundary.

A3 (10-22") Very dark brown and very dark grayish-brown (10YR 2/2 and 3/2) fine sandy loam; weak, fine, subangular blocky structure; very friable; many roots; neutral; gradual, smooth boundary.

B1 (22-41") Dark yellowish-brown (10YR 3/4 to 4/4) fine sandy loam; weak, medium, subangular blocky structure; very friable; few roots; slightly acid; clear, smooth boundary.

IIB21t (41-45") Dark reddish-brown (5YR 3/4) sandy clay loam; moderate, medium, subangular blocky structure; friable; few roots; dark reddish-brown (5YR 3/3) clay films; slightly acid; clear, smooth boundary.

IIB22t (45-57") Dark reddish-brown (5YR 3/4) clay loam; strong, medium, subangular blocky structure; firm; dark reddish-brown (5YR 3/3) clay films; medium acid; clear, smooth boundary.

IIIC1 (57-66") Yellowish-red (5YR 4/6) loamy sand; single grained; loose; medium acid; clear, smooth boundary.

IIIC2 (66-75") Dark reddish-brown (5YR 3/3) stratified loamy sand and clay loam; single grained to massive; very friable to loose; slightly acid. Grades to yellowish-red (5YR 4/6) and then brown (7.5YR 4/4) loamy sand to sand with depth.

Orion Series (415)

This series consists of deep, light-colored soils that are somewhat poorly drained. These soils lie on nearly level bottomlands, mainly in the western and northern parts of the county. They often occur in the upper ends of drainageways in areas where upland soils are light colored and developed under forest vegetation. Orion soils have formed in silty, waterlaid sediments and are used mainly for growing corn and permanent pasture.

Orion soils are geographically associated with Dorchester and Wakeland soils. In most places Orion and Wakeland soils occupy similar nearly level bottomland areas, but some Dorchester soils occupy depressional and gently undulating positions. Light-colored Orion soils are underlain by dark sediments at 20 to 40 inches, but Wakeland soils are light colored to more than 40 inches. The surface layer of Orion soils has neutral or slightly acid reaction, but the moderately dark-colored Dorchester soils have alkaline reaction.

Orion soils have moderate permeability and very high available water capacity. These soils are limited for septic tank filter fields because they have a seasonally high water table.

Included in mapping are the soils in a few small closed depressions in the upland of the western part of the county; they have profiles similar to Orion soils but are not in a bottomland position.

The mapping unit for this series is 415.

Orion silt loam representative profile (415):

A1 (0-5") Stratified brown and dark brown (10YR 5/3 and 4/3) silt loam; weak, fine and medium, granular structure; friable; neutral; clear, smooth boundary.

C1 (5-17") Dark grayish-brown (10YR 4/2) with thin strata of gray and grayish-brown (10YR 5/1 and 5/2) silt loam; weak, fine and medium, granular structure; friable; neutral; gradual, smooth boundary.

C2 (17-32") Stratified very dark gray, dark grayish-brown, and brown (10YR 3/1, 4/2, and 5/3) silt loam; weak, fine, granular with tendency toward thin, platy structure; friable; neutral; abrupt, smooth boundary.

A1b (32-50" +) Black (10YR 2/1) silt loam with high organic matter content in upper 8 inches and with few, fine, distinct, reddish-brown and yellowish-red (5YR 4/4 and 4/6) mottles; weak, fine, granular structure; friable; mildly alkaline.

Otter Series (76)

The Otter series consists of deep, dark-colored soils which are poorly drained. These soils occupy depressional and nearly level bottomlands in all parts of the county but are not as extensive as many of the other soils that occur in the flood plains. Otter soils have formed in silty, waterlaid sediments under native water-loving grasses. Sediments are derived mainly from upland areas which developed under grass vegetation. Undrained Otter soils are used mainly for permanent pasture, but artificially drained areas are used mainly for corn production.

Otter soils are commonly associated with Lawson and Sawmill soils. In most places Otter soils and Sawmill soils lie in depressional bottomland positions. Otter soils, in most areas, lie adjacent to the better drained, nearly level Lawson soils that occupy slightly higher bottomland positions.

Otter soils are moderately permeable and have very high available water capacity. Otter soils are limited for septic tank filter fields and basements because they have a seasonally high water table.

The two mapping units that occur in Carroll County are 76 and 76.

Otter silt loam representative profile (76):

A11 (0-5") Very dark gray (10YR 3/1) silt loam; common, fine, distinct, dark reddish-brown and reddish-brown (5YR 3/4 and 4/4) mottles; moderate, fine, subangular blocky structure; friable; many roots; slightly acid; clear, smooth boundary.

A12 (5-20") Black and very dark brown (10YR 2/1 and 2/2) with a little dark gray (10YR 4/1) silt loam with noticeable sand; common, fine, distinct, dark reddish-brown (5YR 3/4) mottles; moderate, medium to coarse, subangular blocky structure; friable; common roots; neutral; clear, smooth boundary.

A13 (20-28") Black (10YR 2/1) heavy silt loam; moderate, fine to medium, subangular blocky structure; friable; common roots; neutral; clear, smooth boundary.

Cg (28-50" +) Very dark gray and dark gray (10YR 3/1 and 4/1) heavy silt loam; common, fine, distinct, dark reddish-brown (5YR 3/4) mottles; massive, tends to break to weak, blocky structure; friable; common roots; mildly alkaline.

Palms Series (100)

This series consists of deep, dark-colored, organic soils that are very poorly drained. Palms soils usually occupy depressional or level bottomland positions. These soils have formed partly in organic material and partly in underlying silty or loamy mineral deposits under water-tolerant grasses such as reeds and rushes. The organic material ranges from 16 to 50 inches thick. Palms soils are used primarily for growing corn or pasture.

Palms soils most frequently occur with Otter, Lawson, and other bottomland or alluvial soils. Commonly, Palms and Otter soils occupy similar depressional positions enclosed by the somewhat poorly drained Lawson soils that lie slightly higher on nearly level bottomland. Palms soils have organic surface layers. The Otter and Lawson surface layers are silty, mineral material.

Palms soils have moderate permeability and very high available water capacity. These soils are limited for septic tank filter fields and basements because of a seasonally high water table. Because Palms soils are developed from organic matter in the upper solum, they have low bearing strength. These soils could be a source of organic material for use in soil conditioning.

Included in mapping are a few areas where mineral material occurs below 5 feet.

The mapping units for these soils are 100 and 100.

Palms muck representative profile (100):

Oa (0-25") Black (N 2/0) muck; weak, fine and medium, granular structure; very friable; neutral; clear, smooth boundary.

IIC1g (25-37") Black (10YR 2/1) silt loam with high organic matter content; weak, fine and medium, granular structure; friable; mildly alkaline; clear, smooth boundary.

IIC2g (37-60" +) Dark gray and very dark gray (10YR 4/1 and 3/1) silt loam and loam; massive; friable; mildly alkaline.

Palsgrove Series (950 With Dubuque; 951 or Y With Woodbine)

The Palsgrove series is made up of light-colored, well-drained soils that are deep to the underlying limestone bedrock. Bedrock occurs at depths between 40 and 60 inches. These are moderately sloping to very

steep, bedrock-controlled upland soils. These soils occur with Dubuque, dominantly in the northern part of the county but also in the western part in sloping areas where loess is less than 5 feet thick. Palsgrove occurs with Woodbine mainly north and west of Georgetown and near the Ogle County line east of Lanark. Palsgrove formed mostly from silty loess and partly from underlying limestone bedrock under forest vegetation. The primary use of these soils is for growing corn, oats, hay, pasture, and woodland.

Palsgrove soils are geographically associated with Dubuque and Woodbine soils and are mapped with each of these series in an undifferentiated unit. Palsgrove soils are deeper to the bedrock than Dubuque soils and tend to occur on less sloping portions of the mapping units. Palsgrove soils are formed mostly in loess, but Woodbine soils are formed largely from glacial drift. They are mapped together in areas where glacial drift and loess occur as parent materials above bedrock in an erratic pattern. They occupy similar landscape positions and occur on similar slope ranges.

Palsgrove soils have moderate permeability and high to moderate available water capacity. The most favorable rooting zone is in that part of the profile occurring above the bedrock. Below depths of 40 to 60 inches the root movement is restricted to cracks in the bedrock. Because Palsgrove soils have bedrock at about 40 to 60 inches, unfiltered sewage from septic tanks can travel along cracks and crevices and contaminate water supplies. Palsgrove soils are limited for ponds and lakes because water may be lost as it seeps along fractures of the underlying bedrock. The limestone underlying Palsgrove soils could be a source for agricultural limestone or road rock.

The mapping units for Dubuque and Palsgrove (950) are listed on page 28. The units for Palsgrove and Woodbine (951 or Y) are listed on page 57.

Palsgrove silt loam representative profile (950D):

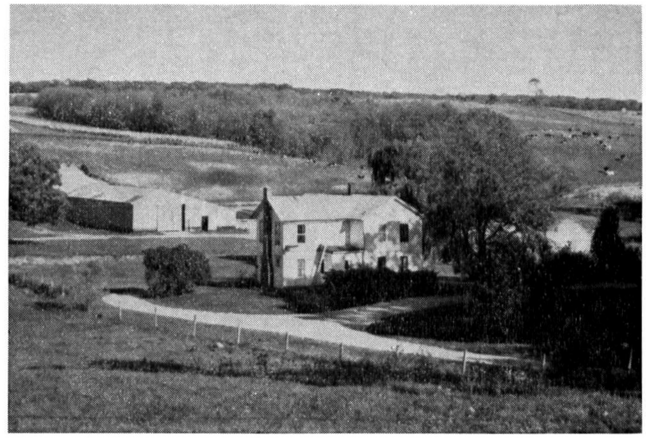
Ap (0-7″) Dark grayish-brown (10YR 4/2) silt loam; moderate, fine, crumb structure; friable; many roots; neutral; abrupt, smooth boundary.

B1 (7-14″) Dark yellowish-brown (10YR 4/4) heavy silt loam; moderate, very fine, subangular blocky structure; friable; many roots; slightly acid; clear, smooth boundary.

B21t (14-29″) Dark yellowish-brown (10YR 4/4) silty clay loam; moderate, fine, subangular blocky structure; firm; common roots; dark brown (10YR 4/3) clay films; light gray (10YR 7/2) silt coatings when dry; medium acid; clear, smooth boundary.

B22t (29-40″) Yellowish-brown (10YR 5/4) silty clay loam; moderate, fine and medium, subangular blocky structure; firm; common roots; nearly continuous, dark brown (10YR 4/3) clay films; light gray (10YR 7/2) silt coatings when dry; strongly acid; clear, smooth boundary.

B31 (40-46″) Yellowish-brown (10YR 5/4) light silty clay loam; moderate, medium, subangular blocky structure; firm; few roots; patchy, dark brown (7.5YR 4/4) clay films; light gray (10YR 7/2) silt coatings when dry; few soft iron-manganese concretions; strongly acid; clear, smooth boundary.



Typical landscape of Palsgrove soils; area shown is northwest of Lanark. Most of the soils are light colored and developed in thin loess, glacial drift, or both, over limestone bedrock. Palsgrove soils occur with Dubuque or Woodbine soils in this area. (Fig. 18)

IIB32 (46-51″) Reddish-brown (5YR 4/4) silty clay to clay; few, fine, distinct, dark reddish-brown (5YR 2/2) mottles; moderate, medium, angular blocky structure; extremely firm; few roots; few reddish-brown (5YR 4/3) clay films; slightly acid; abrupt, smooth boundary.

R (51-60″ +) Brownish-yellow, yellow, and very pale brown (10YR 6/6, 7/6, and 8/4) dolomitic limestone with some white chert; weathered in upper few inches; massive; moderately alkaline; strong effervescence.

Pecatonica Series (21)

The Pecatonica series consists of deep, light-colored soils that are well and moderately well drained. These soils occur on gently sloping to steep upland sites located mainly in the southwest and west-central parts of the county but also in the north-central and east-central parts. They have formed partly in silty loess material (15 to 25 inches thick) but mostly in underlying loamy glacial drift under forest vegetation. The less sloping Pecatonica soils are used for growing corn, oats, and hay, but the steeper areas are used mostly for pastureland and woodland.

Pecatonica soils are associated with Argyle, Flagg, Palsgrove, and Woodbine soils. All these soils occupy slopes on similar upland bedrock-controlled landscapes. Argyle soils have been influenced by grass vegetation. Flagg soils formed in thicker loess than Pecatonica soils. Palsgrove and Woodbine soils are underlain by limestone bedrock at 40 to 60 inches.

Pecatonica soils have moderate permeability and high available water capacity.

Some areas included in mapping have moderately dark surface colors, and a few areas have more than 25 inches of loess.

The mapping units of this series are 21B, 21C, 21C2, 21C3, 21D, 21D2, 21D3, 21E, 21E2, 21E3, 21F, 21F2, and 21F3.

Pecatonica silt loam representative profile (21E):

A1 (0-4″) Very dark grayish-brown (10YR 3/2) silt loam; moderate, fine to medium, granular structure; friable; slightly acid; clear, smooth boundary.

A2 (4-10″) Brown (10YR 5/3) silt loam; weak, thin, platy breaking to granular structure; friable; some worm channel fillings of dark grayish brown (10YR 4/2); slightly acid; clear, smooth boundary.

B1 (10-16″) Dark yellowish-brown (10YR 4/4) light silty clay loam; moderate, very fine, subangular blocky structure; friable; slightly acid; clear, smooth boundary.

IIB21t (16-24″) Dark brown to brown (7.5YR 4/4) silty clay loam with noticeable sand; moderate to strong, fine, angular blocky structure; firm; few dark reddish-brown (5YR 3/4) clay films; slightly acid; clear, smooth boundary.

IIB22t (24-33″) Dark brown to brown (7.5YR 4/4) clay loam; moderate, fine and medium, subangular blocky structure; firm; dark reddish-brown (5YR 3/4) clay films and dark reddish-brown (5YR 2/2) spots; medium acid; gradual, smooth boundary.

IIB23t (33-47″) Brown (7.5YR 5/4) clay loam; few, medium, distinct, brown and yellowish-brown (10YR 5/3 and 5/8) mottles; moderate, medium and coarse, subangular blocky structure; firm; reddish-brown (5YR 4/4) clay films and dark reddish-brown (5YR 2/2) spots; medium acid; clear, wavy boundary.

IIB3t (47-53″) Strong brown (7.5YR 5/6) heavy clay loam; few, medium, distinct, yellowish-brown (10YR 5/4) mottles; weak, coarse, subangular blocky structure; firm; patchy, reddish-brown (5YR 4/4) clay films; neutral; clear, wavy boundary.

IIC (53-80″) Yellowish-brown (10YR 5/4) sandy loam to loam; few, fine, distinct, strong brown (7.5YR 5/8) mottles; weak, medium, angular blocky structure, nearly massive; very occasional, thin, reddish-brown (5YR 4/4) clay films on vertical structural faces; mildly alkaline; slight effervescence. This horizon is glacial till, slightly weathered in upper part.

Plainfield Series (54)

The Plainfield series consists of deep, light-colored soils that are excessively drained. These soils occupy gentle to steep slopes on terraces and upland dunes and ridges near the Mississippi River. Plainfield soils have formed in sandy deposits under a forest vegetation. In many places the sand parent material was deposited by water and reworked by wind. In Carroll County Plainfield soils are used mainly for pasture and woodland, but some areas are idle.

Plainfield soils are associated with Lamont and Bloomfield soils. In most places these soils lie adjacent to each other on ridges and side slopes in an unpredictable pattern. Plainfield soils lack the moisture-retaining clay-iron bands of Bloomfield soils. Plainfield soils are sandier in their surfaces and subsoils than Lamont soils.

Plainfield soils are rapidly permeable and have very low available water capacity. Septic tank filter fields are limited in these soils because effluent moves through the underlying sand and may contaminate underground water supplies. Plainfield soils are locally important as a source of sand for building and road construction. Because this soil has naturally loose consistence, power implement traction is difficult.

In some places in Carroll County, areas mapped as Plainfield soils have clay-iron bands below depths of 5 feet. Because slope is not of extreme importance to use and management of these soils, some areas shown on the soil map occur on slopes slightly outside the range indicated by the mapping unit.

The mapping units shown are 54B, 54C3, and 54F2.

Plainfield sand representative profile (54F2):

Ap (0-8″) Brown (10YR 4/3) sand (nearly loamy sand); weak, medium and coarse, granular structure; very friable; many roots; medium acid; abrupt, smooth boundary.

B1 (8-26″) Dark yellowish-brown (10YR 4/4) sand; single grained; loose; many roots; clear, smooth boundary.

B2 (26-34″) Dark yellowish-brown to yellowish-brown (10YR 4/4 to 5/4) sand; single grained; loose; common roots; medium acid; clear, smooth boundary.

C (34-60″ +) Yellowish-brown to light yellowish-brown (10YR 5/4 to 6/4) coarse sand with about 5 percent gravel; single grained; loose; few roots in upper part; medium acid.

Port Byron Series (277)

The Port Byron series consists of deep, dark-colored soils that are moderately well and well drained. These nearly level to strongly sloping soils occur in the upland, primarily in the southwest part of the county, near Wacker and Fairhaven. They formed in more than 5 feet of loess under grass vegetation. These soils are primarily used for corn, oats, and hay.

Port Byron soils are associated mainly with Joy and Mt. Carroll soils. In most places Port Byron soils occupy narrow ridgetops and side slopes adjacent to drainageways, while the more poorly drained Joy soils occupy the broader and less sloping ridgetops. Mt. Carroll soils are adjacent to Port Byron soils on the prairie-forest borders. In southwestern Fairhaven Township (T23N, R5E) Port Byron soils occur with the Port Byron, sandy substratum phase.

Port Byron soils have moderate permeability and a very high available water capacity. Because Port Byron soils have favorable permeability, they are suited for the construction of level terraces for erosion control. Port Byron soils are limited for ponds and lakes because they do not contain sufficient clay for adequate compaction.

The seven mapping units for this series are 277A, 277B, 277C, 277C2, 277D, 277D2, and 277D3.

Port Byron silt loam representative profile (277B):

A11 (0-9″) Very dark brown (10YR 2/2) silt loam; moderate, fine, granular structure; friable; many roots; neutral; clear, smooth boundary.

A12 (9-13″) Very dark brown and very dark grayish-brown (10YR 2/2 and 3/2) silt loam; moderate, fine to medium, granular structure; friable; many roots; neutral; gradual, smooth boundary.

A3 (13-18″) Dark brown (10YR 3/3) silt loam; weak, very fine, subangular blocky structure; friable; common roots; medium acid; gradual, smooth boundary.

B1 (18-29″) Dark yellowish-brown (10YR 3/4) silt loam; weak, fine, subangular blocky structure; friable; common roots; light gray (10YR 7/1) silt coatings when dry; strongly acid; gradual, smooth boundary.

B21 (29-38″) Dark yellowish-brown (10YR 4/4) silt loam; moderate, medium, subangular blocky structure; friable; common roots; light gray (10YR 7/1) silt coatings when dry; strongly acid; gradual, smooth boundary.

B22 (38-49″) Yellowish-brown (10YR 5/4) silt loam; moderate, medium, subangular blocky structure; friable; common roots; thin, dark yellowish-brown (10YR 4/4) coatings; light gray (10YR 7/1) silt coatings when dry; medium acid; gradual, smooth boundary.

B3 (49-58″) Brown (10YR 5/3) silt loam; weak, coarse, subangular blocky structure; friable; few roots; few, thin, dark yellowish-brown (10YR 4/4) coatings; medium acid; gradual, smooth boundary.

C (58-100″) Brown and yellowish-brown (10YR 5/3 and 5/4) silt loam; massive to weak, coarse, subangular blocky structure; friable; slightly acid.

Port Byron, Sandy Substratum Phase (562)

This sandy substratum phase of the Port Byron series consists of dark-colored, deep soils that are well drained. These soils occupy gently sloping to strongly sloping upland positions and are located mainly in the southwestern part of the county. Port Byron, sandy substratum soils have formed primarily in loess but partly in underlying sandy material (water and wind deposits) under grassland vegetation. Corn, oats, and hay are the main crops grown on these soils.

Port Byron, sandy substratum soils are predominantly associated with Waukegan and Port Byron soils. In most places Port Byron, sandy substratum phase and Waukegan soils lie on similar dune-like landscapes, but Port Byron, sandy substratum soils are formed in thicker loess than Waukegan soils. Port Byron soils are formed entirely in loess.

These soils have moderate permeability and high available water capacity. The most favorable rooting zone is limited to the portion of the profile developed in loess; below this depth the loose sand has low available moisture capacity. They are limited for septic tank filter fields because effluent can move through the underlying sand and contaminate water supplies. These soils are limited for ponds because the soil material does not compact well and water can seep away through the underlying sandy material. Because they have favorable permeability, they are suited for building level terraces for erosion control.

The five mapping units that occur in the county are 562B, 562C, 562C2, 562D, and 562D2.

Port Byron silt loam, sandy substratum representative profile (562B):

A1 (0-15″) Very dark brown (10YR 2/2) silt loam; moderate, medium, granular structure; friable; many roots; medium acid; clear, smooth boundary.

A3 (15-20″) Dark brown (10YR 3/3) silt loam; moderate, medium to coarse, granular structure; friable; many roots; strongly acid; clear, smooth boundary.

B1 (20-26″) Dark brown to brown (7.5YR 4/4) silt loam; weak, medium to coarse, subangular blocky structure; friable; common roots; strongly acid; gradual, smooth boundary.

B2 (26-35″) Dark brown to brown (7.5YR 4/4) heavy silt loam; weak, medium to coarse, subangular blocky structure; friable; common roots; few clay coatings; strongly acid; clear, smooth boundary.

B3 (35-44″) Dark yellowish-brown (10YR 4/4) loam; weak, coarse, subangular blocky structure; friable; few roots; strongly acid; abrupt, wavy boundary.

IIB + C (44-70″ +) Yellowish-brown (10YR 5/6 and 5/8) fine sand containing a few ¼- to ½-inch loamy sand clay-iron bands; single grained; loose; medium acid.

Rodman Series (93)

The Rodman series consists of dark- and moderately dark-colored, excessively drained soils that are very shallow to calcareous gravel and sand. These soils occupy very strongly sloping, small, rounded hills and ridges and occur in limited extent in the southern half of the county. A representative area of small gravelly ridges occurs near the Ogle County border north of Hazelhurst. Rodman soils have formed in calcareous gravelly deposits, mainly under grass vegetation but in some places under sparse forest. These gravelly deposits are probably water deposited and some appear to be small kames or eskers. In Carroll County most Rodman soils are used for permanent pasture.

Rodman soils are geographically associated with Casco and Fox soils. In most places Rodman or Casco soils occupy the side slopes of the ridges and knobs. Rodman soils are calcareous and more shallow to gravel than Casco or Fox soils. Fox soils frequently occupy the crests of the knobs above Rodman or Casco soils on the side slopes. Soils derived from glacial till and from loess also occur with Rodman soils.

These soils are very rapidly permeable and have very low available water capacity. The most favorable rooting zone is limited to the surface layer. Below the surface layer is calcareous gravel that is very low in water-holding capacity and high in natural lime. The high calcium and magnesium content causes a decrease in availability of other essential elements. The very rapid permeability of this soil is a limitation to septic tank filter fields because unfiltered sewage can contaminate water supplies. Rodman soils and the underlying material can be a source of gravel for building and road construction.

The only mapping unit shown on the soil map is 93E2. The average slope range for this unit is 12 to 18 percent. Small areas included in mapping occur outside this slope range.

Rodman gravelly loam representative profile (93E2):

A1 (0-10") Very dark brown (10YR 2/2) gravelly loam; moderate, fine, granular structure; friable; many roots; mildly alkaline; slight effervescence; clear, smooth boundary.

C1 (10-24") Dark brown to brown (7.5YR 4/4) loamy gravel; weak, fine, granular structure to single grained; very friable to loose; few roots; moderately alkaline; strong effervescence; diffuse, smooth boundary.

C2 (24-60" +) Dark yellowish-brown (10YR 4/4) gravel with some sand; single grained; loose; moderately alkaline; violent effervescence.

Rozetta Series (279)

This series consists of deep, light-colored soils that are moderately well drained. These are nearly level to moderately sloping soils in the uplands and on terrace benches, mainly in the western half of the county. Rozetta soils formed in more than 5 feet of loess under forest vegetation. These soils are used primarily for growing corn, oats, and hay.

Rozetta soils are associated with Fayette, Downs, and Atterberry soils. In most places Rozetta soils lie on broader ridgetops and more level areas than the well-drained Fayette soils. Rozetta soils occupy similar upland slopes adjacent to the prairie-influenced Downs soils. In a few places the somewhat poorly drained and darker Atterberry soils lie on nearly level to gently sloping positions adjacent to Rozetta soils.

Rozetta soils are moderately permeable and have high to very high available water capacity.

A few areas included with Rozetta soils are somewhat poorly drained.

The mapping units shown on the maps are 279A, 279B, and 279C.

Rozetta silt loam representative profile (279C):

A1 (0-5") Very dark gray (10YR 3/1) silt loam; moderate, medium, granular structure; friable; strongly acid; clear, smooth boundary.

A2 (5-12") Dark grayish-brown and brown (10YR 4/2 and 4/3) silt loam; weak, thick, platy structure breaking to fine, subangular blocky structure; friable; strongly acid; clear, smooth boundary.

B1 (12-19") Dark brown to brown (10YR 4/3) heavy silt loam; weak, medium, subangular blocky structure; friable; strongly acid; clear, smooth boundary.

B21t (19-26") Dark yellowish-brown (10YR 4/4) silty clay loam; moderate, medium, subangular blocky structure; firm; dark brown (10YR 4/3) clay films; strongly acid; clear, smooth boundary.

B22t (26-39") Dark yellowish-brown (10YR 4/4) silty clay loam; few, fine, distinct, grayish-brown (10YR 5/2) mottles; moderate, medium, subangular blocky structure; firm; dark brown (10YR 4/3) clay films; pale brown (10YR 6/3) silt coatings; many iron-manganese concretions; medium acid; clear, smooth boundary.

B3 (39-45") Yellowish-brown (10YR 5/4) light silty clay loam; few, medium, distinct, grayish-brown (10YR 5/2) and common, medium, prominent, strong brown (7.5YR 5/8) mottles; moderate, coarse, subangular blocky structure; friable; thin dark brown (10YR 4/3) clay films; pale brown (10YR 6/3) silt coatings; many iron-manganese concretions; medium acid; clear, smooth boundary.

C (45-60" +) Yellowish-brown (10YR 5/4) silt loam; few, medium, distinct, grayish-brown (10YR 5/2) and common, medium, prominent, reddish-brown (5YR 4/4) mottles; massive, breaking to weak, coarse, angular blocky structure; friable; pale brown (10YR 6/3) silt coatings; many iron-manganese concretions; slightly acid.

Sable Series (68)

The Sable series consists of deep, dark-colored soils that are poorly drained. These soils occupy flat plains, shallow depressions, and narrow upland drainageways. They also occur occasionally on stream terraces. Sable soils have formed in more than 5 feet of loess under native water-loving grasses. They occur mainly in the eastern one-third of Carroll County. Sable soils are used mainly for corn production.

Sable soils are associated with Muscatine and Tama soils. Sable soils, in most places, occupy depressional positions next to the better drained Muscatine and Tama soils.

Sable soils are moderately permeable and have very high available water capacity. They are limited for septic tank filter fields and basements because they have a seasonally high water table.

The two mapping units that occur in the county are 68 and 68+. The 68+ unit has recently deposited sediments on the surface that are usually of lighter color and texture than the original surface.

Sable silty clay loam representative profile (68):

Ap (0-8") Black (10YR 2/1) light silty clay loam; moderate, coarse, granular structure; firm; neutral; abrupt, smooth boundary.

A12 (8-17") Black (10YR 2/1) silty clay loam; moderate, medium, granular structure; firm; neutral; clear, smooth boundary.

B1g (17-23") Dark grayish-brown and grayish-brown (2.5Y 4/2 and 5/2) silty clay loam; few, fine, distinct, yellowish-brown (10YR 5/6) mottles; moderate, fine, subangular blocky structure; firm; black (10YR 2/1) organic coatings; neutral; clear, smooth boundary.

B21g (23-32") Grayish-brown and light brownish-gray (2.5Y 5/2 and 6/2) silty clay loam; common, fine, distinct, yellowish-brown (10YR 5/6 and 5/8) mottles; compound moderate, fine and medium, prismatic and medium, angular blocky and subangular blocky structure; firm; black (10YR 2/1) iron concretions and stains; very dark grayish-brown (10YR 3/2) organic coatings; mildly alkaline; clear, smooth boundary.

B22g (32-40") Grayish-brown and light brownish-gray (2.5Y 5/2 and 6/2) silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/6 and 5/8) mottles; compound weak, fine and medium, prismatic and weak, medium, angular blocky structure; firm; numerous small black (10YR 2/1) iron concretions and stains; very dark grayish-brown (10YR 3/2) organic coatings and channel fillings; mildly alkaline; clear, smooth boundary.

B3g (40-49″) Grayish-brown and light brownish-gray (2.5Y 5/2 and 6/2) light silty clay loam; common, medium, distinct, yellowish-brown (10YR 5/6 and 5/8) mottles; weak, medium and coarse, angular blocky structure; firm; numerous small black (10YR 2/1) iron concretions and stains; occasional very dark grayish-brown (10YR 3/2) organic coatings and channel fillings; mildly alkaline; clear, smooth boundary.

Cg (49-70″ +) Mixed light brownish-gray (2.5Y 6/2) and yellowish-brown (10YR 5/6 and 5/8) silt loam; massive; friable; occasional very dark grayish-brown (10YR 3/2) root channel fillings; moderately alkaline; slightly effervescent.

Sawmill Series (107)

The Sawmill series consists of deep, dark-colored soils that are poorly drained. These soils occupy nearly level and depressional bottomlands. Sawmill soils are the dominant bottomland soil northeast of Shannon and southeast of Thomson and occur in limited extent in other areas. They have formed in water-deposited silty clay loam material and are finer textured than the other floodplain soils in the county. These soils are used mostly for corn.

Sawmill soils are geographically associated with Lawson and Dorchester soils. Sawmill soils, in most areas, occupy lower bottomland positions than the silt loam, better drained, nearly level Lawson and Dorchester soils. Sawmill soils are darker than Dorchester soils and are not calcareous.

Sawmill soils have moderate to moderately slow permeability and a very high available water capacity. These soils are limited for septic tank filter fields and basements because they occur in areas that have a seasonally high water table.

Included in mapping are two areas in the western half of Section 19, T24N, R4E, where limestone bedrock occurs at depths between 30 and 60 inches. The 107+ mapping unit has recently deposited silt loam sediments averaging about 7 to 20 inches thick over the silty clay loam original surface. In the flood plain along Lost Creek, north and northeast of Shannon, this unit is extensive. In some areas the silt loam overwashed material is thicker, and the profile is similar to Radford soils (mapped in adjacent Stephenson County but not in Carroll County).

The mapping units for the Sawmill series are 107, 107, and 107+.

Sawmill silty clay loam representative profile (107):

A1 (0-18″) Black (N 2/0) silty clay loam; moderate, fine to medium, subangular blocky structure; firm; many roots; neutral; gradual, smooth boundary.

A3 (18-26″) Very dark gray (10YR 3/1) silty clay loam; few, fine, faint, dark brown (10YR 3/3) spots or mottles; weak, medium, subangular blocky structure; firm; common roots; root channels and krotovina of black (10YR 2/1); neutral; clear, smooth boundary.

B21g (26-35″) Dark gray (10YR 4/1) silty clay loam; few, fine, faint, brown (10YR 4/3) spots or mottles; moderate, medium, subangular blocky structure; firm; common roots; root channels and krotovina of black (10YR 2/1) and very dark gray (10YR 2/1 and 3/1); neutral; clear, smooth boundary.

B22g (35-48″) Dark gray to gray (5Y 4/1 to 5/1) silty clay loam; many, medium, prominent, yellowish-red (5YR 4/8) mottles; moderate, medium to coarse, subangular and angular blocky structure; firm; common roots; root channels and krotovina of black and very dark gray (10YR 2/1 and 3/1); mildly alkaline; clear, smooth boundary.

Cg (48-60″) Grayish-brown (2.5Y 5/2) stratified silt loam and silty clay loam; common, medium, prominent mottles of dark brown (7.5YR 4/4); massive, with tendency to break into weak, coarse, angular blocky structure; friable; few roots in upper part; some krotovina of very dark gray (10YR 3/1); mildly alkaline; slight effervescence.

Seaton Series (274)

The Seaton series consists of deep, light-colored soils that are well drained. These are gently sloping to very steep upland soils. They lie on the western side of the county in a narrow belt, 3 to 6 miles wide, east from the Mississippi River bluffs. They formed in loess, usually several feet thick, under forest vegetation. Seaton soils are similar to Fayette soils but contain less clay, especially in the B horizon. These soils are primarily used for corn, oats, hay, pasture, and timber.

Seaton soils occur mainly with Timula and Mt. Carroll soils. In most places near the bluffs, Seaton soils occupy less sloping positions than the thin B horizon Timula soils. Like Timula soils, some Seaton soils occupy steeper positions. In most places Seaton soils occupy the more sloping positions adjacent to the grassland-influenced Mt. Carroll soils.

Seaton soils have moderate permeability and a very high available water capacity. Because Seaton soils have favorable permeability, they are suited for building level terraces for erosion control. Seaton soils are limited for ponds and lakes because they do not contain sufficient clay for adequate compaction.

Many mapping units for this series occur in Carroll County: 274B, 274C, 274D, 274D2, 274D3, 274E, 274E2, 274E3, 274F, 274F2, 274F3, and 274G2.

A few areas are included in mapping that have thicker, darker colored A1 or Ap horizons than normal for the Seaton series.

Seaton silt loam representative profile (274C):

A1 (0-5″) Dark grayish-brown and very dark grayish-brown (10YR 4/2 and 3/2) silt loam; weak, fine, crumb structure; friable; many roots; medium acid; clear, smooth boundary.

A2 (5-10″) Dark grayish-brown (10YR 4/2) silt loam; weak, thin, platy structure; friable; many roots; light gray (10YR 7/1) silt coatings when dry; strongly acid; clear, smooth boundary.

AB (10-17″) Dark brown (10YR 4/3) silt loam; weak, thin to medium, platy structure breaking to very fine and fine, subangular blocky structure; friable; many roots; few, thin, brown clay films; few light gray (10YR 7/1) silt coatings when dry; medium acid; clear, smooth boundary.

B2t (17-33″) Dark brown (10YR 4/3) silt loam; moderate, fine to medium, subangular blocky structure; friable; common roots; few, thin, brown clay films; few light gray (10 YR 7/1) silt coatings when dry; medium acid; gradual, smooth boundary.

B3 (33-60″) Dark brown (10YR 4/3) silt loam; weak, medium to coarse, subangular blocky structure, nearly structureless or massive in lower part; friable; few roots; few light gray (10YR 7/1) silt coatings when dry; medium acid; gradual, smooth boundary.

C1 (60-70″) Brown to yellowish-brown (10YR 5/3 and 5/4) silt loam; massive; friable; slightly acid to neutral; clear, smooth boundary.

C2 (70-90″ +) Yellowish-brown to light yellowish-brown (10YR 5/4 and 6/4) silt loam; massive; friable; moderately alkaline; strong effervescence.

Seaton, Sandy Substratum Phase (563)

This sandy substratum phase of the Seaton series consists of light-colored, deep soils that are well drained. These soils occupy gently sloping to very strongly sloping upland positions. Seaton, sandy substratum soils are located mainly in the southwestern part of the county. These soils have formed primarily in loess but partly in underlying sandy material (water and wind deposited) under the influence of forest vegetation. The loess varies from 40 to 60 inches in thickness. Most Seaton, sandy substratum soils are used to grow corn, oats, and hay, but some areas are used for permanent pasture or woodland.

Seaton, sandy substratum soils are predominantly associated with Seaton, Tell, and Lamont soils. Seaton soils are developed entirely in loess. The sandy substratum phase has developed in 40 to 60 inches of loess over sand and Tell soils in about 20 to 40 inches of loess over sand. Lamont soils have developed in sandy sediments with no loess cover. All these soils occur on similar landscape positions, often in a complex pattern.

Seaton, sandy substratum soils have moderate permeability and high available water capacity. The most favorable rooting zone is limited to the loessial parent material; the loose sand below the loess has low available water capacity. These soils are limited for septic tank filter fields because effluent can move through the underlying sand and contaminate water supplies. They are limited for ponds because the soil material does not compact well and water can seep away through the underlying sandy material. Because these soils have favorable permeability, they are suited for building level terraces for erosion control.

The mapping units for the Seaton, sandy substratum soils are 563B, 563C, 563C2, 563D, 563D2, 563D3, and 563E3.

Seaton silt loam, sandy substratum representative profile (563C):

A1 (0-3″) Very dark grayish-brown (10YR 3/2) silt loam; weak, fine to medium, granular structure; very friable; many roots; neutral; clear, smooth boundary.

A2 (3-10″) Brown (10YR 4/3) silt loam; moderate, very thin to thin, platy structure; very friable; common roots; strongly acid; gradual, smooth boundary.

B1 (10-17″) Dark brown (7.5YR 3/4) silt loam; weak, medium to coarse, subangular blocky structure; friable; few roots; strongly acid; gradual, smooth boundary.

B21 (17-34″) Dark brown to brown (7.5YR 4/4) silt loam; moderate, medium to coarse, subangular blocky structure; friable; few roots; strongly acid; gradual, smooth boundary.

B22t (34-43″) Dark brown to brown (7.5YR 4/4) silt loam; moderate, medium to coarse, subangular and angular blocky structure; friable; few, thin, clay films; strongly acid; abrupt, wavy boundary.

IIB3 + C (43-60″ +) Yellowish-brown to dark yellowish-brown (10YR 5/4 to 4/4) fine sand containing a few dark brown (7.5YR 4/4) ½- to 1½-inch loamy fine sand clay-iron bands; single grained; loose; medium acid.

Selma Series (125)

This series consists of deep, dark-colored soils that are poorly drained. These soils occupy nearly level areas, often in depressions and narrow drainageways on the terraces of the Mississippi River in southwestern Carroll County. Selma soils have formed mostly in loamy material and partly in underlying sandy deposits under water-tolerant grasses. They do not occur extensively. Most Selma soils are used for growing corn.

Selma soils are predominantly associated with Dickinson, Gilford, and Hoopeston soils. Dickinson and Hoopeston soils are sandier, have better natural drainage, and tend to occur at higher elevations than Selma soils. Gilford soils occupy similar positions and have similar natural drainage but are sandier and more permeable than Selma soils.

Selma soils have moderate permeability and high available water capacity. These soils are limited for septic tank filter fields and basements because they have a seasonally high water table.

The only mapping unit of the Selma series is 125.

Selma loam representative profile (125):

Ap (0-7″) Black (10YR 2/1) loam; moderate, fine and medium, granular structure; friable; many roots; high content of organic matter; neutral; abrupt, smooth boundary.

A12 (7-14″) Black to very dark gray (10YR 2/1 to 3/1) loam; moderate, medium and coarse, granular structure; friable; common roots; neutral; clear, smooth boundary.

A3 or B1 (14-21″) Black to very dark gray (10YR 2/1 to 3/1) light silty clay loam with noticeable sand; moderate, fine, subangular blocky structure; friable; common roots; neutral; clear, smooth boundary.

B21g (21-29″) Dark gray (10YR 4/1) light clay loam; moderate, fine, prismatic structure breaking to medium and coarse, angular blocky structure; firm; common roots; few very dark gray (10YR 3/1) organic coatings; neutral; clear, smooth boundary.

B22g (29-38″) Grayish-brown and light brownish-gray (2.5Y 5/2 and 6/2) clay loam; few, fine, distinct, dark brown and strong brown (7.5YR 4/4 and 5/6) mottles; weak, fine, prismatic structure breaking to medium and coarse, angular

blocky structure; firm; few roots; very dark gray (10YR 3/1) organic coatings; neutral; clear, smooth boundary.

B3g (38-43") Dark gray and dark grayish-brown (2.5Y 4/1 and 4/2) sandy loam; weak, coarse, angular blocky structure; friable; few roots; neutral; abrupt, smooth boundary.

IIC1g (43-53") Light gray and grayish-brown (10YR 6/1 and 5/2) sand; single grained; loose; neutral; gradual, smooth boundary.

IIC2g (53-60" +) Dark gray, gray, and grayish-brown (10YR 4/1, 5/1, and 5/2) with occasional ¼- to ½-inch strata of reddish-brown (5YR 4/3) medium sand; single grained; loose; neutral.

Area of Sogn soils on ridge at right. Note small quarry in the area of sparse vegetation. The buildings are on Port Byron soils. (Fig. 19)

Sogn Series (504)

This series consists of dark- and moderately dark-colored, well-drained soils that are very shallow to limestone bedrock. Bedrock usually occurs at depths of less than 10 or 15 inches, and outcropping occurs. They are very strongly sloping to very steep upland soils lying mainly in the western half of the county. These soils formed in loamy or silty material which overlies the bedrock. They are used mainly for permanent pasture and woodland, but a few areas are idle.

Sogn soils are predominantly geographically associated with Dunbarton, Dubuque, and Palsgrove soils. In most places Sogn and Dunbarton soils occupy similar slopes on bedrock-controlled landscapes, but in other places Sogn soils lie on stronger slopes below Dunbarton soils. Dubuque and Palsgrove soils tend to occur on the ridgetops, where the bedrock is deeper. Sogn soils lack a subsoil layer that is characteristic of the associated soils.

Sogn soils have moderate permeability and very low available water capacity. The rooting zone is limited primarily to the very thin layer above the limestone bedrock. The very shallow depth to limestone bedrock limits these soils for basements, cemeteries, and structures requiring excavation. Because water seeps through cracks and crevices in the limestone, Sogn soils are limited for ponds. These soils could be used as a source of agricultural limestone or road rock.

The two mapping units shown on the soil map are 504E2 and 504G2.

Sogn silt loam representative profile (504G2):

A1 (0-6") Black (10YR 2/1) silt loam containing a few limestone fragments; weak to moderate, fine, granular structure; friable; mildly alkaline; clear, smooth boundary.

R (6-60" +) Limestone bedrock with weathering joints. The upper 5 inches contains broken limestone and chert fragments mixed with very dark brown (10YR 2/2) silt loam material; massive; moderately alkaline; strong effervescence.

Sparta Series (88)

The Sparta series consists of deep, dark-colored soils that are excessively drained. These soils occupy nearly level to very strongly sloping terrace positions, upland dunes, and ridges, dominantly in the southwestern part of the county. Sparta soils have formed in very sandy material under native prairie grasses. These are the most extensive sandy soils in the county. Sparta soils are used for growing corn, small grains, hay, trees, and melons.

Sparta soils are geographically associated with Ade and Plainfield soils. In most places these soils lie adjacent to each other in an unpredictable pattern. Sparta soils lack the clay-iron bands or lamellae that are present in Ade soils. Sparta soils have darker and thicker surface horizons than Plainfield soils.

Sparta soils are rapidly to very rapidly permeable with low to very low available water capacity. Septic tank filter fields are limited in these soils because effluent can move through the underlying sand and contaminate water supplies. In some areas Sparta soils are locally important as a source of sand for building and road construction. Farm implement traction is difficult because these soils have loose consistence.

Included in mapping with the nearly level and gently sloping mapping units are soils that have dark surface horizons more than 2 feet thick. The very strongly sloping unit, 88E, includes a few areas which have slopes exceeding 18 percent. Clay-iron bands may occur below 5 feet in some areas.

The mapping units shown on the soil map are 88A, 88B, 88C, 88C2, 88D, and 88E.

Sparta loamy sand representative profile (88B):

A1 (0-20") Black to very dark brown (10YR 2/1 to 2/2) loamy sand; weak, medium, subangular blocky structure; very friable; many roots; slightly acid; clear, smooth boundary.

A3 (20-25") Very dark brown to very dark grayish-brown (10YR 2/2 to 3/2) loamy sand; weak, medium to coarse, subangular blocky structure; very friable to loose; common roots; medium acid; clear, smooth boundary.

B (25-33") Dark yellowish-brown (10YR 4/4) loamy sand; single grained; loose; few roots; medium acid; clear, smooth boundary.

Alfalfa and a planting of pines on a gently sloping area of Sparta loamy sand just east of the Mississippi River and south of Savanna. (Fig. 20)

C1 (33-43″) Brown to yellowish-brown (10YR 5/3 and 5/4) fine sand; single grained; loose; few roots; medium acid; clear, wavy boundary.

C2 (43-65″ +) Yellowish-brown (10YR 5/5) sand; single grained; loose; medium acid.

Strawn Series (224)

The Strawn series consists of light-colored, well-drained soils that are shallow to underlying calcareous, loam-textured till. These upland soils occur on moderately sloping to steep slopes and lie dominantly in small, scattered mapping units to the north and east of Argo and in the east-central part of the county. Occasionally, they have a few inches of loess on the surface but are developed mainly in loamy glacial till under forest vegetation. Depth to calcareous till is normally less than 2 feet. Strawn soils are used primarily for corn, oats, hay, and pasture.

Strawn soils are associated with many soils but most commonly with Pecatonica, Argyle, and Myrtle soils. Strawn and Pecatonica soils occupy similar landscape positions, but Strawn soils have a thinner solum and calcareous till at shallower depths. In most places Strawn soils occupy more sloping side slopes than Argyle and Myrtle soils. Strawn, Pecatonica, and Argyle soils formed primarily in glacial drift, but Myrtle soils formed partly in loess and partly in drift. Argyle and Myrtle have darker colored surface horizons; they have developed under mixed grassland and forest vegetation.

Strawn soils have moderate permeability. The available water capacity ranges from moderate to high. The most favorable rooting zone is in the solum above the calcareous till.

Included in mapping are a few small areas that have calcareous till on or very near the surface.

The mapping units that occur in the county are 224C2, 224D2, 224E2, 224E3, 224F2, and 224F3. These units are moderately or severely eroded. The representative description is of a severely eroded site.

Strawn soils representative profile (224E3):

Ap (0-8″) Mixed very dark grayish-brown, dark yellowish-brown, and yellowish-brown (10YR 3/2, 4/4, and 5/4) silty clay loam; moderate, medium, subangular and angular blocky structure; firm; neutral; abrupt, smooth boundary.

B2t (8-19″) Yellowish-brown to dark yellowish-brown (10YR 5/4 to 4/4) clay loam; moderate, medium to coarse, subangular blocky structure; firm; thin dark brown (10YR 4/3) clay films; neutral; abrupt, wavy boundary.

C (19-60″ +) Yellowish-brown to light yellowish-brown (10YR 5/4 to 6/4) loam; few, coarse, distinct, yellowish brown (10YR 5/6 and 5/8) mottles; weak, coarse, subangular blocky structure, nearly massive; firm; moderately alkaline; strong effervescence.

Sylvan Series (19)

The Sylvan series consists of light-colored, well-drained soils that are moderately deep to calcareous loess. Calcareous loess normally occurs at depths of less than 40 inches. These soils occupy very strongly sloping to very steep uplands, mainly in the western one-third of Carroll County. Sylvan soils have formed in greater than 5 feet of loess under native forest vegetation. In Carroll County many areas of Sylvan soils are used for permanent pasture. Some areas are used for cropland or remain in woodland.

Sylvan soils are geographically associated with Fayette and Hamburg soils. Sylvan soils, in most places, lie on the side slopes adjacent to drainageways where Fayette soils occupy the less sloping ridgetops. Hamburg soils lie on the Mississippi River bluffs, while Sylvan soils occupy slopes adjacent to the tributaries of the Mississippi River. Sylvan soils have a thinner B horizon and are more shallow to calcareous loess than Fayette soils. Hamburg soils are calcareous at the surface and lack the clayey subsoil of Sylvan soils.

Sylvan soils are moderately permeable and have high available water capacity. The most favorable rooting zone extends to about 2½ feet; below this depth the lime content is high, causing a decrease in the availability of phosphate and potash.

A few areas included with this series occur on very steep slopes where calcareous loess occurs below 40 inches. Some small cultivated areas are included which have calcareous loess exposed on the surface.

The mapping units of this series are 19E3, 19F2, 19F3, 19G2, and 19G3.

Sylvan soils representative profile (19E3):

Ap (0-5″) Dark brown to dark yellowish-brown (10YR 4/3 to 4/4) silty clay loam; weak, medium, subangular blocky structure; firm; neutral; clear, smooth boundary.

B2t (5-14″) Dark yellowish-brown (10YR 4/4) silty clay loam; moderate, fine to medium, subangular blocky structure; firm; few dark brown (10YR 4/3) clay films; slightly acid; clear, smooth boundary.

B3 (14-22″) Brown (10YR 5/3) heavy silt loam; weak, medium, subangular blocky structure; friable; mildly alkaline; clear, smooth boundary.

C (22″+) Mixed grayish-brown (10YR 5/2), light brownish-gray (10YR 6/2), and reddish-brown (5YR 4/4) silt loam; massive; friable; moderately alkaline; strong effervescence.

Tama Series (36)

The Tama series consists of deep, dark-colored soils that are well and moderately well drained. These are nearly level to very strongly sloping soils of the uplands and terraces in the eastern one-third of Carroll County. They formed in loess, more than 5 feet thick, under native grass vegetation. These soils are used primarily for corn, oats, and hay and are very extensive.

Tama soils occur mainly with Muscatine and Downs soils. Tama soils occupy the sloping areas adjacent to the somewhat poorly drained Muscatine soils. Tama soils lack the influence of forest vegetation that is apparent in Downs soils.

Tama soils are moderately permeable and have very high available water capacity.

A few small areas included with Tama have developed in slightly less than 5 feet of loess.

The mapping units which are shown on the soil map are 36A, 36B, 36B2, 36C, 36C2, 36C3, 36D, 36D2, 36D3, 36E2, and 36E3.

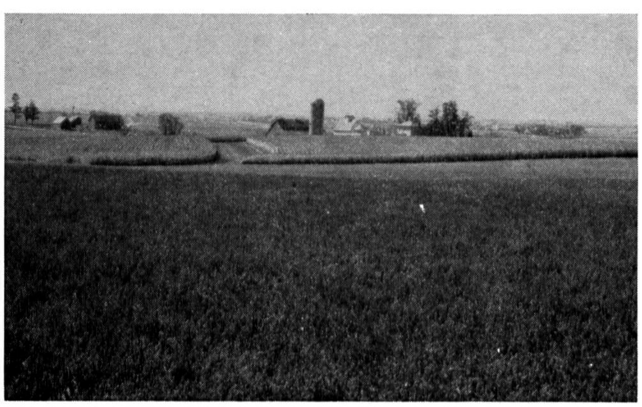
Tama silt loam representative profile (36A):

A1 (0-13″) Black (10YR 2/1) silt loam; moderate, medium, granular structure; friable; many roots; slightly acid; clear, smooth boundary.

A3 (13-18″) Very dark brown to very dark grayish-brown (10YR 2/2 to 3/2) silt loam; moderate, coarse, granular structure; friable; many roots; medium acid; clear, smooth boundary.

B1 (18-23″) Dark brown (10YR 3/3) silt loam; weak, fine, subangular blocky structure; friable; many roots; strongly acid; clear, smooth boundary.

B21t (23-29″) Dark brown to brown (10YR 4/3) heavy silt loam; weak to moderate, fine, subangular blocky structure; friable; many roots; light brownish-gray (10YR 6/2) silt coatings when dry; strongly acid; clear, smooth boundary.



Typical landscape in east-central Carroll County, where productive Tama soils are dominant. (Fig. 21)

B22t (29-37″) Dark brown to brown (10YR 4/3) silty clay loam; moderate, fine to medium, subangular blocky structure; firm; common roots; few dark yellowish-brown (10YR 3/4) clay films; light brownish-gray (10YR 6/2) silt coatings when dry; strongly acid; clear, smooth boundary.

B23t (37-45″) Dark brown to brown (10YR 4/3) silty clay loam; moderate, medium, subangular blocky structure; firm; few roots; few dark yellowish-brown (10YR 3/4) clay films; light brownish-gray (10YR 6/2) silt coatings when dry; strongly acid; clear, smooth boundary.

B3t (45-53″) Brown to dark yellowish-brown (10YR 4/3 to 4/4) silty clay loam; few, fine, faint, yellowish-brown (10YR 5/4) mottles; weak, medium to coarse, subangular and angular blocky structure; friable; few roots; few clay coatings; light brownish-gray (10YR 6/2) silt coatings when dry; few small iron-manganese concretions; strongly acid; clear, smooth boundary.

C1 (53-97″) Dark yellowish-brown to yellowish-brown (10YR 4/4 to 5/4) silt loam; common, fine, faint, brown (10 YR 5/3) mottles; massive; friable; few roots in upper part; few small iron-manganese concretions; medium acid. Calcareous Peoria Loess at 97 inches.

Tell Series (565; 952 or Z With Lamont)

The Tell series consists of light-colored, well-drained soils that are moderately deep to underlying sandy material. These soils occur on gently sloping to steep upland and terrace positions. Tell soils are located dominantly south and east of Argo and south of Wacker near the Mississippi River and Johnson Creek. They formed partly from silty material (dominantly loess) and partly from the underlying sandy material under forest vegetation. Depth to sandy material is usually 20 to 40 inches. They are used primarily for growing corn, oats, hay, and timber.

Tell soils are geographically associated with Lamont and Seaton, sandy substratum soils. In most places Tell soils occupy slopes similar to these soils, but Seaton, sandy substratum soils are formed from thicker silty material over sand and Lamont soils are formed entirely from sandy material. Where the depth of silty material over the underlying sand varies greatly within short distances, Tell and Lamont soils are difficult to separate. In such areas they are combined on soil maps to form complex mapping units.

Tell soils have moderate permeability in the silty parent material and rapid permeability in the underlying sand. Available water capacity is moderate. The most favorable rooting zone extends to a depth of about 2 to 3 feet. Below this depth is sandy material with low fertility and low available water. Because Tell soils are underlain by sandy material, unfiltered sewage from septic tanks can contaminate water supplies. In most places Tell may be a source of sand because the silty overburden is thin.

Some of the most severe water erosion in Carroll County occurs in the Tell-Lamont complex areas. As small gullies become entrenched, the underlying sand undercuts in areas where there is thin loess or silty overburden, and the gullying accelerates rapidly.

Tell soils occur separately in these mapping units: 565B, 565C, 565C2, 565D, 565D2, 565D3, 565E2, 565-E3, 565F2, and 565F3. They occur as a complex with Lamont soils in the following mapping units: 952C or ZC, 952C2 or ZC2, 952D2 or ZD2, 952D3 or ZD3, 952-E2 or ZE2, 952E3 or ZE3, 952F or ZF, 952F2 or ZF2, and 952F4 or ZF4.

Tell silt loam representative profile (565D):

A1 (0-5") Very dark grayish-brown to dark brown (10YR 3/2 to 3/3) silt loam; weak, fine to medium, crumb structure; friable; many roots; medium acid; clear, smooth boundary.

A2 (5-11") Brown (10YR 4/3 and 5/3) silt loam; moderate, medium, granular structure; very friable; many roots; medium acid; clear, smooth boundary.

B1 (11-16") Dark yellowish-brown (10YR 4/4) silt loam; moderate, medium, subangular blocky structure; friable; many roots; medium acid; clear, smooth boundary.

B21t (16-27") Dark brown to dark yellowish-brown (10YR 4/3 to 4/4) heavy silt loam; moderate, medium, subangular blocky structure; firm; common roots; few clay films and some pale brown (10YR 6/3) coatings; strongly acid; gradual, wavy boundary.

IIB31 (27-31") Dark yellowish-brown (10YR 4/4) loam; weak, medium, subangular blocky structure; friable; few roots; few pale brown (10YR 6/3) coatings; strongly acid; gradual, wavy boundary.

IIB32 + C (31-39") Yellowish-brown (10YR 5/4) loamy sand, with few dark reddish-brown (5YR 3/4) sandy loam clay-iron lamellae; single grained in loamy sand; weak, subangular blocky structure in lamellae; loose or very friable; medium acid; clear, wavy boundary.

IIC (39-60" +) Yellowish-brown (10YR 5/4) sand to loamy sand; single grained; loose; medium acid.

Terrace Escarpments (577)

The areas that are mapped as Terrace Escarpments make up a land type that contains a variety of soils and soil materials in a complex pattern. This land type occurs on strongly sloping to steep terrace breaks and is usually moderately to severely eroded. It occurs on short slopes of stream terraces where the terraces break sharply into the stream bottoms or where drainageways and tributary streams have cut back into the terrace formation. The major area of occurrence is on terrace breaks along the lower portion of Plum River, but small areas occur elsewhere in the western part of the county. Machinery and equipment can be used on many of these areas, but cultivation is difficult. Permanent pasture and woodland are primary uses.

The parent material of this land type is mainly lacustrine sediments of silty clay to clay texture which occur often in stratified colors of red and gray overlying silt loam and sandy loam sediments. The clayey sediments are often 4 to 6 feet thick. In some areas a thin loess cover may occur at the surface. The clayey sediments are often strongly to very strongly acid, and the underlying silt loam to sandy loam sediments are neutral to alkaline, often containing carbonates. On the slopes of this land type, clayey and strongly acid materials may occur on the upper part of the slope and loamy materials that are neutral or calcareous may occur on the lower part of the slope. Surface texture may range from sandy loam to clay, but silt loam to silty clay are most common. Most areas were originally forested, and light-colored surfaces are dominant. Some dark-colored surfaces occur in areas that have been protected from erosion.

Natural drainage of this land type is difficult to assess. Most areas will range from moderately well to somewhat poorly drained. Permeability and available water capacity are variable. Where silty clay and clay materials are dominant, permeability is very slow.

The principal associated soils are Niota; Niota, clayey subsurface variant; and Zwingle. They occur on the nearly level to gently sloping areas above the Terrace Escarpments.

Three mapping units are shown on the soil map: 577D, 577E, and 577F. The 577F unit includes some areas where the slope exceeds 30 percent.

Because of the extreme variability of this land type, no representative profile description can be given.

Timula Series (271)

This series consists of moderately dark- to light-colored, well-drained soils that are shallow to calcareous loess. These soils occupy very strongly sloping to very steep uplands mostly near the bluffs of the Mississippi River. Timula soils formed in deep silty loess under forest vegetation. They are used primarily for pasture and woodland, but some less sloping areas are used to grow corn, oats, and hay.

Timula soils are associated with Seaton and Hamburg soils. Timula soils, in most places, lie on the side

Timula soils occur on steep bluff area in background. The red cedar trees do well in areas where calcareous material occurs near the surface (Timula soils have calcareous loess at less than 3 feet). Drury soils are in the foreground. (Fig. 22)

slopes next to drainageways. Seaton soils occupy the less sloping ridgetops. Hamburg soils lie on the Mississippi River bluffs. Timula soils also occur on the bluffs and, in addition, occupy slopes adjacent to the tributaries of the Mississippi River. Timula soils have a thinner B horizon and are more shallow to calcareous loess than Seaton soils. Hamburg soils are calcareous at the surface and lack the B horizon of Timula soils.

Timula soils have moderate permeability and high available water capacity. The most favorable rooting zone extends to about 2½ feet; below this depth the lime content is high, causing a decrease in the availability of phosphate and potash. Because Timula soils have favorable permeability, they are suited for building level terraces for erosion control. Timula soils are limited for ponds and lakes because they do not contain sufficient clay for adequate compaction.

The three mapping units in Carroll County are 271E2, 271F2, and 271G2.

Timula silt loam representative profile (271G2):

A1 (0-5") Dark brown (10YR 3/3) silt loam; weak, fine, crumb structure; friable; neutral; clear, smooth boundary.

AB (5-11") Dark yellowish-brown (10YR 4/4) silt loam; weak, fine to medium, subangular blocky structure; friable; neutral; clear, smooth boundary.

B2 (11-23") Yellowish-brown (10YR 5/4) silt loam; weak, medium, subangular blocky structure; friable; neutral; clear, wavy boundary.

C (23-65" +) Brown to pale brown (10YR 5/3 to 6/3) silt loam or silt; massive; friable; moderately alkaline; strong effervescence. Lime concretions are present and become large at about 45 inches.

Wakeland Series (333)

This series consists of deep, light-colored soils that are somewhat poorly drained. These soils are inextensive and occupy nearly level bottomlands, mainly in the north-central and western parts of the county. They occur in the narrow, upper ends of drainageways, receiving sediment from upland slopes which were forested. Wakeland soils have formed in silty, waterlaid sediments. They are used mainly for growing corn and permanent pasture.

Wakeland soils are predominantly geographically associated with Orion and Dorchester soils. Wakeland and Orion soils occupy similar, nearly level bottomland areas. Dorchester soils occupy level and gently sloping positions in areas where the flood plain tends to be broader. The light colors of Wakeland soils extend to 40 inches or more, but the light-colored surface of Orion soils is underlain by dark sediments at 20 to 40 inches. Wakeland soils have neutral or slightly acid reaction, but Dorchester soils are calcareous.

Wakeland soils are moderately permeable and have very high to high available water capacity. These soils are limited for septic tank filter fields because they have a seasonally high water table.

The single mapping unit of this soil is 333.

Wakeland silt loam representative profile (333):

A1 (0-11") Brown (10YR 4/3) silt loam; weak, medium, granular structure; friable; neutral; clear, smooth boundary.

B21 (11-30") Dark grayish-brown (10YR 4/2) silt loam; few, fine, distinct, brown (7.5YR 5/4) mottles; weak, medium, granular structure; friable; neutral; gradual, smooth boundary.

B22 (30-40") Dark grayish-brown and dark gray (10YR 4/2 and 4/1) silt loam; few, fine, distinct, dark brown (7.5YR 4/4 and 3/2) mottles; weak, medium, granular structure; friable; neutral; gradual, smooth boundary.

C (40-50" +) Stratified dark grayish-brown, grayish-brown, and gray (10YR 4/2, 5/2, and 5/1) silt loam; few, fine, distinct, dark brown (7.5YR 3/2) mottles; massive; friable; mildly alkaline.

Waukegan Series (564)

This series consists of dark-colored, well-drained soils that are moderately deep to underlying sandy material. Waukegan soils occupy gently sloping to very strongly sloping upland areas and terrace benches. They are located mainly in the southwestern part of the county. Waukegan soils are formed partly in silty material (dominantly loess) and partly from the underlying sandy material under grass vegetation. These soils are used mainly for growing corn, oats, and hay.

Waukegan soils are commonly associated with Worthen, Dickinson, and Port Byron, sandy substratum soils. In most places Waukegan soils occupy the same kind of landscape positions as these soils. Waukegan soils are formed in 20 to 40 inches of silty materials on sand, and Worthen and Port Byron, sandy substratum soils are developed in deeper silts. Dickinson soils are formed primarily in sandy material and tend to occur on ridges.

Waukegan soils occur with Port Byron, sandy substratum soils in upland areas and with Worthen soils primarily in terrace positions. The underlying sandy material tends to be coarser in the terrace positions.

Waukegan soils have moderate permeability in the silty part of the profile and rapid permeability in the underlying sand. They have moderate available water capacity. The most favorable rooting zone is limited to about 2 to 3 feet; below this depth the sandy material has low available water capacity and plant nutrients. Because Waukegan soils are underlain by sandy material, septic tank effluent can contaminate water supplies. These soils are limited for ponds because the soil material does not compact favorably and water can seep away through the underlying sand. In most places Waukegan soils are a good source of sand because the silty overburden is thin.

A few areas are included with Waukegan where slope exceeds 18 percent.

The mapping units of this series are 564B, 564C, 564C2, 564D2, and 564E2.

Waukegan silt loam representative profile (564B):

Ap (0-8") Very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; friable; many roots; neutral; abrupt, smooth boundary.

A3 (8-13") Dark brown (10YR 3/3) silt loam; moderate, medium, granular structure; friable; many roots; slightly acid; clear, smooth boundary.

B21 (13-17") Dark brown to brown (10YR 4/3) silt loam; some root channel fillings of very dark grayish brown (10YR 3/2); weak, coarse, granular to weak, fine, subangular blocky structure; friable; many roots; slightly acid; gradual, smooth boundary.

B22 (17-22") Dark brown to brown (7.5YR 4/4) silt loam; weak, fine to medium, subangular blocky structure; friable; common roots; strongly acid; gradual, smooth boundary.

B23 (22-28") Dark brown to brown (7.5YR 4/4) silt loam; weak, medium to coarse, subangular blocky structure; friable; common roots; strongly acid; abrupt, wavy boundary.

IIB31 (28-34") Yellowish-brown (10YR 5/4) sandy loam; weak, coarse, subangular blocky structure; very friable; common roots; medium acid; clear, wavy boundary.

IIB32 + C (34-50") Yellowish-brown (10YR 5/4 and 5/8) fine sand, with few dark brown (7.5YR 4/4) loamy fine sand clay-iron lamellae; single grained in sand; weak, subangular blocky structure in lamellae; loose; few roots; slightly acid; clear, wavy boundary.

IIC (50-72" +) Brown to yellowish-brown (10YR 5/3 to 5/4) fine and medium sand; single grained; loose; neutral.

Woodbine Series (951 or Y With Palsgrove)

The Woodbine series consists of light-colored, well-drained soils that are deep to underlying dolomitic limestone bedrock. Bedrock occurs at depths between 40 and 60 inches. These are moderately sloping to very steep upland soils and are located mainly in the northern part of Carroll County, occurring occasionally in the southwestern part and in an area near the Ogle County line east of the town of Lanark. They formed mostly from thin loess and loamy glacial drift over limestone bedrock under forest vegetation. The primary use of these soils is for growing corn, oats, hay, pasture, and woodland.

Woodbine soils are mapped only with Palsgrove soils as an undifferentiated unit. They occupy similar landscape positions and slope ranges. Palsgrove is developed primarily in loess over bedrock. These soils occur together in areas where glacial drift and loess overlie limestone bedrock in an erratic pattern. Dubuque and Dunbarton soils occur with Woodbine soils in areas where limestone is encountered at less than 40 inches and soils are primarily developed in loess.

Woodbine soils have moderate permeability and high to moderate available water capacity. The most favorable rooting area is in the solum above the bedrock. The limestone bedrock causes lateral root movement along its surface or a constricted movement of the roots into cracks.

Because Woodbine soils have bedrock at depths between 40 and 60 inches, unfiltered sewage from septic tanks can travel along cracks and crevices and contaminate water supplies. Woodbine soils are limited in use for ponds or lakes because water may be lost through cracks and crevasses in the underlying bedrock. The limestone underlying Woodbine could be a source for agricultural limestone or road rock.

The 13 mapping units for Palsgrove and Woodbine soils are 951C or YC, 951C2 or YC2, 951D or YD, 951D2 or YD2, 951D3 or YD3, 951E or YE, 951E2 or YE2, 951E3 or YE3, 951F or YF, 951F2 or YF2, 951F3 or YF3, 951G2 or YG2, and 951G3 or YG3.

Woodbine silt loam representative profile (951D or YD):

A1 (0-5") Very dark gray (10YR 3/1) silt loam; moderate, very fine, granular structure; friable; neutral; clear, smooth boundary.

A2 (5-11") Brown (10YR 5/3) with some very dark grayish-brown (10YR 3/2) silt loam; moderate, fine, granular structure; friable; slightly acid; clear, smooth boundary.

B1 (11-15") Dark brown to brown (10YR 4/3) heavy silt loam; moderate, fine, granular structure; friable; medium acid; clear, smooth boundary.

B21t (15-20") Dark yellowish-brown (10YR 4/4) silty clay loam; moderate, fine, subangular blocky structure; friable to firm; few dark brown (10YR 4/3) clay films; medium acid; clear, smooth boundary.

IIB22t (20-30") Dark brown (7.5YR 4/4) silty clay loam with noticeable sand; moderate, medium, subangular blocky structure; firm; few dark brown (7.5YR 4/3) clay films; medium acid; clear, smooth boundary.

IIB23t (30-38") Dark brown (7.5YR 4/4) to reddish-brown (5YR 4/4) heavy clay loam; moderate, medium, subangular blocky structure; firm; dark reddish-brown (5YR 3/3) clay films; strongly acid; clear, smooth boundary.

IIB31t (38-45") Dark brown (7.5YR 4/4) clay loam; moderate, medium, subangular and angular blocky structure; firm; reddish-brown and dark reddish-brown (5YR 4/4 and 3/4) clay films; medium acid; abrupt, smooth boundary.

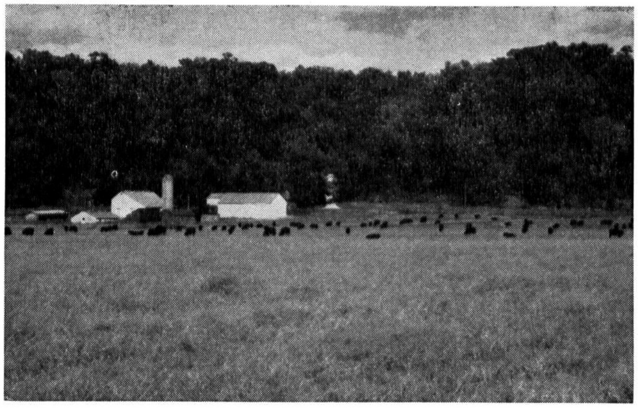
IIIB32t (45-50") Dark reddish-brown (5YR 3/4) silty clay to clay with some chert fragments; weak, coarse, angular blocky structure; extremely firm; few dark reddish-brown (5YR 3/3) clay films; neutral; clear, wavy boundary.

R (50-60" +) Yellow (10YR 7/6 and 7/8) fractured limestone bedrock, weathered in the upper few inches; massive; strong effervescence.

Worthen Series (37)

The Worthen series consists of deep, dark-colored, well- and moderately well-drained soils. These soils occupy nearly level to strongly sloping areas on stream terrace benches and outwash areas and also occur in colluvial areas adjacent to the base of upland bluffs. Worthen soils have formed in silty material, mainly water deposited, under native prairie grasses. They lie mainly in the western fourth of Carroll County, but some small areas are adjacent to narrow upland drainageways in other parts of the county. Worthen soils are used mainly for growing corn, oats, and hay.

Worthen soils are associated with the somewhat poorly drained Littleton soils. In most places they occupy higher, better drained positions than Littleton.



Cattle grazing on youthful bluff-wash soil area of Worthen and Littleton soils. Forested bluff area has soils shallow to limestone rock and soils derived from windblown sand and silty loess. (Fig. 23)

Worthen soils are moderately permeable and have very high available water capacity.

Included in mapping are areas which have loamy or occasionally sandy sediments at less than 5 feet. A few areas have more clay in the B horizon than typical for the series. In some places the dark colors of the surface horizons are not as thick as described here.

Four mapping units are shown for this series: 37A, 37B, 37C, and 37D2.

Worthen silt loam representative profile (37B):

A11 (0-11″) Very dark brown (10YR 2/2) silt loam; moderate, medium to coarse, granular structure with tendency toward medium, platy structure; friable; many roots; medium acid; gradual, smooth boundary.

A12 (11-19″) Very dark brown and very dark grayish-brown (10YR 2/2 and 3/2) silt loam; weak, medium to coarse, granular structure; friable; many roots; few light gray (10YR 7/1) silt coatings when dry; medium acid; gradual, smooth boundary.

B1 (19-24″) Dark brown (10YR 3/3) silt loam with root channels of very dark brown (10YR 2/2); weak, medium, subangular blocky structure; friable; common roots; few light gray (10YR 7/1) silt coatings when dry; medium acid; clear, smooth boundary.

B2 (24-34″) Dark brown to brown (10YR 3/3 to 4/3) silt loam; weak, medium to coarse, subangular blocky structure; friable; common roots; very few, thin and patchy, clay films; few light gray (10YR 7/1) silt coatings when dry; medium acid; clear, smooth boundary.

B3 (34-40″) Mixed dark brown and brown (10YR 3/3, 4/3, and 5/3) silt loam; weak, coarse, subangular blocky structure; friable; few roots; slightly acid; clear, smooth boundary.

C (40-60″ +) Dark yellowish-brown and yellowish-brown (10YR 4/4 and 5/4) silt loam with few lenses of loam; few, fine, distinct, yellowish-red (5YR 4/8) mottles; massive; friable; few roots in upper part; slightly acid.

Zwingle Series (576)

This series consists of light-colored, deep soils that are poorly to somewhat poorly drained. These soils occupy nearly level to moderately sloping terraces mainly along the lower part of Plum River. Zwingle soils have formed partly in silty loess material and partly in underlying red and gray, clayey, lacustrine deposits under forest vegetation. The silt loam A1 and A2 horizons are probably developed in loess. Most Zwingle soils are used to grow corn, oats, and hay, but some areas remain in native woodland.

Zwingle soils occur with Niota and Niota, clayey subsurface variant soils and the Terrace Escarpment land type. In some places Zwingle soils lie on slightly higher areas adjacent to the nearly level to depressional Niota, clayey subsurface variant soils. In other places they lie adjacent to the short Terrace Escarpment areas. Zwingle soils occupy landscape positions similar to the Niota soils but have lighter colored surface horizons.

Zwingle soils have very slow permeability and moderate available water capacity. These soils are limited for septic tank filter fields and tile drainage because they are very slowly permeable and in places have a high water table. Because of the clayey material in the subsoil, Zwingle soils have low bearing strength and a high shrink-swell ratio.

This series is not extensive in the county. Included in mapping are areas where gray colors, rather than red colors, are found in the B horizons. Natural drainage is difficult to assess where red colors are dominant in the lacustrine sediments. Most gently and moderately sloping mapping units in the county are somewhat poorly drained rather than poorly drained.

The three mapping units occurring in the county are 576A, 576B, and 576C.

Zwingle silt loam representative profile (576A):

A1 (0-5″) Very dark gray (10YR 3/1) silt loam; moderate, fine to medium, granular structure; friable; many roots; neutral; clear, smooth boundary.

A21 (5-10″) Mixed very dark gray and grayish-brown (10YR 3/1 and 5/2) silt loam; weak, fine, crumb structure; friable; many roots; neutral; clear, wavy boundary.

A22 (10-16″) Grayish-brown and brown (10YR 5/2 and 5/3) silt loam; moderate, medium, platy structure; friable; common roots; neutral; abrupt, smooth boundary.

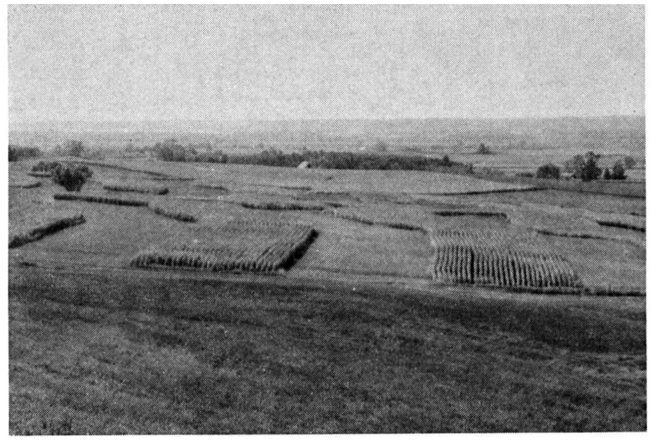
IIB21t (16-30″) Mixed brown and yellowish-brown (10YR 5/3 and 5/4) and yellowish-red (5YR 4/6) fine silty clay loam with few, fine, distinct, dark reddish-gray (5YR 4/2) mottles; moderate, fine to medium, subangular and angular blocky structure; firm; common roots; continuous clay films; many black iron-manganese concretions; slightly acid; clear, smooth boundary.

IIB22t (30-55″) Mixed reddish-brown (2.5YR 4/4) and grayish-brown (10YR 5/2) silty clay with few, fine, distinct, yellowish-brown (10YR 5/8) mottles; moderate, fine to medium, subangular blocky structure; very firm; few roots; nearly continuous clay films; many black iron-manganese concretions; strongly acid; clear, smooth boundary.

IIIC (55-65″ +) Mixed brown and light brownish-gray (10YR 4/3 and 6/2) loam; massive; friable; few black iron-manganese concretions; medium acid. Contains carbonates at about 80 inches.

INTERPRETATION OF SOILS FOR SPECIFIC PURPOSES

This section has six main parts. The first part groups the soils into capability units or management groups and explains the capability classification used by the Soil Conservation Service to show the relative suitability of the soils for crops. The second part consists mainly of a table giving the predicted yields under a high level of management. The third part discusses use and management of soils for woodland in the county. The fourth part discusses the kind of wildlife and use of soils for wildlife. The fifth part discusses the use of the soils for recreation. The sixth part consists of soil engineering data and interpretations.



Contour stripcropping used on sloping areas as a soil conservation measure. (Fig. 24)

General Management of Soils for Cropland and Pasture

About 60 percent of Carroll County is cultivated. Corn and soybeans are the principal crops. Small grains and forages are other important crops.

The main considerations in managing cultivated soils in the county are controlling erosion, overcoming wetness hazards, protecting from flooding, conserving moisture, and maintaining tilth and fertility.

Measures that will help control erosion include terraces, contour farming, conservation tillage, cover crops, grassed waterways, and the use of crop residue. Generally, a combination of several measures is used.

Measures that will help overcome wetness include the use of tile drains, shallow surface ditches, inlets to tile drains, drainage ditches, and diversions. Protection from flooding can be achieved with levees.

Conserving moisture generally means reducing evaporation, limiting runoff, increasing infiltration, and controlling weeds. Practices that help conserve moisture include conservation tillage, use of crop residue, contour farming, stripcropping, and field windbreaks.

Among the measures that help maintain tilth and fertility are the application of chemical fertilizer, green manure, and barnyard manure and the inclusion in the cropping system of cover crops, grasses, and legumes. Crops respond well to fertilizers on all soils used for cropland. Application of lime is needed periodically, especially on most upland and terrace soils. Control of erosion also helps conserve fertility and maintain tilth.

Good management is very important for rotational and permanent pasture. Renovation of pasturelands is the key to obtaining profitable grazing land. Renovation consists of applying lime and fertilizer according to the results of soil tests, controlling erosion, preparing a good seedbed, using a combination of adapted legumes and grasses for seeding, controlling weeds, and controlling grazing.

The soils in capability classes I, II, III, and IV are generally used for field crops and rotational pastures rather than for permanent pastures. When they are used for permanent pastures and when the pastures are renovated and well managed, good yields are generally obtained.

If renovation is practical, the soils in capability classes V, VI, and VII can be used for permanent pastures. Where complete renovation is not feasible, those practices that are feasible can be used, or the area should be kept in trees or used for wildlife.

CAPABILITY GROUPING

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The groups are made according to the limitations of the soils when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive land-forming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to crops requiring special management, such as horticultural crops.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for forest trees or for engineering.

In the capability system all kinds of soils are grouped at three levels — the capability class, subclass, and unit. These are discussed in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and

narrower choices for practical use and are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture, woodland, or wildlife.

Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture, woodland, or wildlife.

Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture, woodland, or wildlife.

Class VIII soils and landforms have limitations that preclude their use for commercial plants and restrict them to recreation, wildlife, water supply, or aesthetic purposes (there are no class VIII soils in Carroll County).

Capability subclasses are soil groups within one class; they are designated by adding a small letter, e, w, s, or c, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, drouthy, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry (no c subclasses occur in Carroll County).

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by w, s, and c, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, woodland, wildlife, or recreation.

Capability units, sometimes referred to as *management groups,* are soil units within the subclasses. The soils in one unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIw-1 or IIIe-1.

The capability classification of the soils in Carroll County is given in the Guide to Mapping Units (see pages 131 to 136).

CAPABILITY UNITS

In the following pages the capability units in Carroll County are described, and suggestions for use and management for all the soils of each unit are given. Soils used for cultivated crops generally need lime and fertilizers. The amounts to apply on a given soil should be determined by soil tests. The names of soil series represented are mentioned in the description of each capability unit, but this does not mean that all soils of a given series appear in the unit. To find the names of all the soils in any given capability unit, refer to the Guide to Mapping Units (pages 131 to 136).

Capability Unit I-1. This unit consists of dark-, moderately dark-, and light-colored, nearly level soils. They are deep, moderately well or well drained, and have medium-textured surface soils and medium- or moderately fine-textured subsoils or subsurfaces.

These soils are moderately permeable and have a high to very high available water capacity. They have favorable natural fertility and are very productive if proper soil management is used. The natural organic matter content of Camden silt loam and Rozetta silt loam is lower than in the other soils in the group. The soils in this unit are Camden (134A), Downs (386A), Huntsville (77), Joy (275A), Port Byron (277A), Rozetta (279A), Tama (36A), and Worthen (37A).

These soils are primarily used and well suited for growing corn, oats, and alfalfa hay. If these soils are properly managed, they are suited to very intensive cropping. Intertilled crops such as corn and soybeans can be grown using legumes and grasses such as alfalfa and bromegrass to maintain a satisfactory physical condition in the soil. Because Camden silt loam and Rozetta silt loam have a lower organic matter content than the other soils in the group, they will require more frequent use of legumes and grasses to maintain favorable tilth.

If these soils are used for growing pasture, legumes and grasses such as alfalfa, red clover, birdsfoot trefoil, bromegrass, timothy, and orchardgrass are suitable for seeding. Unless there is an existing stand of trees, the soils in this unit are seldom used for woodland.

Capability Unit I-2. This unit consists of dark-, moderately dark-, and light-colored, nearly level soils. They are deep, somewhat poorly drained, and have medium-textured surface soils and medium- or moderately fine-textured subsoils or subsurfaces.

These soils are moderately permeable and have a high to very high available water capacity. They are very productive if proper soil management is used. The natural organic matter content of Orion silt loam and Wakeland silt loam is lower than in the other soils in the group. The soils in this unit are Atterberry (61A), Dorchester (239A), Dorchester, cobbly subsoil variant (578), Lawson (451), Littleton (81A), Muscatine (41A), Orion (415), and Wakeland (333).

These soils are mainly used and well suited for growing corn, oats, and alfalfa hay. If these soils are properly managed, they are suited to very intensive cropping. Row crops such as corn and soybeans can be grown using legumes and grasses such as red clover and timothy to maintain a satisfactory physical condition in the soil. Because Orion silt loam and Wakeland silt loam have a lower organic matter content than the other soils in the group, they will require more frequent use of legumes and grasses to maintain favorable tilth.

All of the soils in this unit have favorable natural fertility except Dorchester silt loam and Dorchester silt loam, cobbly subsoil variant. Dorchester soils are naturally high in lime, causing the availability of phosphorus and most of the minor nutrients to be reduced. Superphosphate applied annually on these high-lime soils will be more readily available to the crops than infrequent bulk additions.

Where improved drainage is needed for increased production and ease of operation, tile will function satisfactorily if outlets are available.

If these soils are adequately drained and used for growing pasture, legumes and grasses such as alfalfa, birdsfoot trefoil, timothy, bromegrass, orchardgrass, or red, ladino, or alsike clover are suitable for seeding. The soils in this unit are seldom used for woodland.

Capability Unit IIe-1. This unit consists of dark-, moderately dark-, and light-colored, gently sloping and moderately sloping soils. They are deep, moderately well or well drained, and have medium-textured surface soils and dominantly medium- or moderately fine-textured subsoils.

These soils are dominantly high in available water capacity and are primarily moderately permeable. All of the soils in this unit except Strawn silt loam have favorable natural fertility and are very productive if properly managed. The soils in this unit are subject to some surface runoff and erosion if cultivated. The organic matter content ranges from high to low. The soils in this unit are Argyle (227B, 227C, 227C2), Ashdale (411B, 411C2), Camden (134B, 134C, 134C2), Downs (386B, 386C, 386C2), Drury (75B, 75C, 75C2), Durand (416C, 416C2), Eleroy and Derinda (949C2), Fayette (280B, 280B2, 280C, 280C2), Flagg (419B, 419C, 419C2), Hitt (506C2), Joy (275B), Keltner (546C2), Mt. Carroll (268B, 268C, 268C2), Myrtle (414B, 414C, 414C2), Ogle (412C, 412C2), Ogle, silt loam subsoil variant (574B, 574C), Palsgrove and Woodbine (951C, 951C2), Pecatonica (21B, 21C, 21C2), Port Byron (277B, 277C, 277C2), Port Byron, sandy substratum (562B, 562C, 562C2), Rozetta (279B, 279C), Seaton (274B, 274C), Seaton, sandy substratum (563B, 563C, 563C2), Strawn (224C2), Tama (36B, 36B2, 36C, 36C2), and Worthen (37B, 37C).

These soils are mainly used and well suited for growing corn, oats, and alfalfa hay. The gently sloping soils in the unit are suited to intensive cropping. Intertilled crops such as corn and soybeans can be grown in a sequence with small grain and a stand-over meadow crop. The moderately sloping soils in the group are more suited to moderate cropping. Row crops such as corn and soybeans can be grown in a sequence with small grain and two years of meadow. More row crops can be grown if erosion control practices are established. To maintain desirable tilth, a greater proportion of meadow crops to row crops will be needed on the moderately eroded soils and on soils developed under a timber vegetation. (Refer to the series description of a given soil in this unit to determine its native vegetation.)

Because calcareous till is near the surface of the Strawn soil in the unit, favorable rooting is limited to the upper 2 feet of soil. Regulated fertilizer additions based on the needs of the crop to be grown are necessary for best yields on this high-lime soil.

In addition to conservation cropping on these soils, erosion control practices such as contour tillage and terraces are suitable for decreasing runoff.

If these soils are used for growing pasture, legumes and grasses such as alfalfa, red clover, birdsfoot trefoil, bromegrass, timothy, and orchardgrass are suitable for seeding. Unless there is an existing stand of trees, the soils in this unit are seldom used for woodland.

Capability Unit IIe-2. This unit consists of dark- and moderately dark-colored, gently sloping and moderately sloping soils. They are deep, somewhat poorly drained, and have medium-textured surface soils and medium- or moderately fine-textured subsoils or subsurfaces.

These soils are primarily moderately permeable and have a high to very high available water capacity. They are very productive if proper soil management is used. The soils in this unit are subject to some surface runoff and erosion if cultivated. These soils have a high water table during part of the year. Seasonal wetness is a limitation. The organic matter content is predominantly high. The soils in this unit are Atterberry (61B), Dorchester (239B), Littleton (81B, 81C), Muscatine (41B), and Loran (572C).

These soils are mainly used and well suited for growing corn, oats, and alfalfa hay. The gently sloping soils in the group are suited to intensive cropping. Row crops such as corn and soybeans can be grown in a sequence with small grain and a stand-over meadow crop. The moderately sloping soils in the group are better suited to moderate cropping. Intertilled crops such as corn and soybeans can be grown in a sequence with small grain and two years of meadow. More row crops can be grown if erosion control practices such as terraces and contour tillage are used to reduce runoff.

If these soils need additional drainage as an improvement measure for increased production and ease of operation, tile will function adequately.

All of the soils in this unit have favorable natural fertility except Dorchester silt loam. Dorchester soils are naturally high in lime, causing the availability of phosphorus and most of the minor nutrients to be reduced. Superphosphate applied annually to this high-lime soil will be more readily available to the crops than infrequent bulk additions.

If these soils are adequately drained and used for growing pasture, legumes and grasses such as alfalfa, birdsfoot trefoil, timothy, bromegrass, orchardgrass, or red, ladino, or alsike clover are suitable for seeding. The soils in this unit are seldom used for woodland.

Capability Unit IIe-3. This unit consists of dark- and light-colored, gently sloping soils. They are moderately deep, well drained, and have medium- or moderately coarse-textured surface soils and medium- or moderately fine-textured subsoils.

These soils have moderately rapid permeability and moderate available water capacity and productivity. The soils in this unit are subject to some surface runoff and erosion if cultivated. They have coarse-textured material in the root zone, causing drouthiness to be a secondary limitation. The natural organic matter content of Tell silt loam is lower than in the other soils in the group. The soils in this unit are Onarga, reddish subsoil variant (673B), Tell (565B), and Waukegan (564B).

These soils are mainly used for growing corn, oats, and alfalfa hay. The soils in this unit are suited to intensive cropping. Row crops such as corn and soybeans can be grown in a sequence with small grain and a stand-over meadow crop. More row crops can be grown if erosion control practices are established. Maintaining favorable tilth on the Tell soil will require more frequent use of meadow crops than on the other soils in the unit, which are higher in organic matter.

The coarse-textured material in the root zone is very permeable, causing leaching of needed plant nutrients. Fertilizer additions based on the needs of the specific crop will help avoid this costly loss.

Conservation cropping, in combination with erosion control practices such as contour tillage and terraces, is suitable for decreasing runoff.

An abundant source of water for regulated irrigation in conjunction with proper management is essential for best yields on these soils. A very good crop response can be expected where irrigation is practiced.

The Onarga, reddish subsoil variant soil is more susceptible to soil blowing than the other soils in the group. Wind strips that include the use of close-growing crops such as oats, alfalfa, and bromegrass in the cropping system are an effective wind erosion control practice.

If these soils are used for growing pasture, legumes and grasses such as alfalfa, birdsfoot trefoil, bromegrass, timothy, or orchardgrass are suitable for seeding. Unless there is an existing stand of trees, the soils in this unit are seldom used for woodland.

Capability Unit IIw-1. This unit consists of dark- and moderately dark-colored, nearly level soils. They are deep, poorly drained, and have medium- or moderately fine-textured surface soils and medium- to fine-textured subsoils or subsurfaces.

These soils are moderately to slowly permeable and have a high to very high available water capacity. The organic matter content is predominantly high. All the soils except Edgington silt loam are highly productive. Wetness, which can be corrected by drainage, is a permanent limitation of these soils. Millington, Otter, and Sawmill soils in this unit are subject to occasional damaging overflow. The soils in this unit are Drummer (152), Edgington (272), Edgington, overwash (272 +), Millington (82), Otter (76), Sable (68), Sable, overwash (68 +), Sawmill (107), Sawmill, overwash (107 +), and Selma (125).

These soils are mostly used and well suited for corn production. If these soils are properly managed, including adequate drainage, they are suited to very intensive cropping. Row crops such as corn and soybeans can be grown using legumes and grasses such as alsike clover and timothy to maintain a desirable air and water relationship in the soil.

All of the soils in this unit have favorable natural fertility except Millington silt loam. The Millington soils are naturally high in lime, causing the availability of phosphorus and most of the minor nutrients to be reduced. Superphosphate applied annually on this high-lime soil will be more readily available to the crops than infrequent bulk additions.

Unless drainage systems have been installed, improved drainage is needed for higher yields and ease of operation. If outlets are available, tile will function satisfactorily on all the soils except the Edgington soil. Because the Edgington soil has slow permeability, tile do not draw at a satisfactory rate and open surface ditches must be used.

If these soils are used for growing pasture, legumes and grasses such as alsike or ladino clover, birdsfoot trefoil, timothy, or reed canarygrass are suitable for seeding.

The soils in this unit are seldom used for woodland.

Capability Unit IIw-2. This unit consists of dark- and moderately dark-colored, nearly level soils. They are moderately deep, poorly and somewhat poorly drained, and have medium- or moderately coarse-textured surface soils and subsoils.

These soils have moderately rapid permeability and moderate available water capacity and productivity. The organic matter content is high. Wetness, which can be corrected by drainage, is a permanent hazard of these soils. They have coarse-textured material in the root zone, causing drouthiness to be a secondary limitation. The soils in this unit are Hoopeston (172, 237), Hoopeston, overwash (237 +), and Gilford (201).

These soils are used mostly for growing corn, oats, and hay or pasture. If these soils are properly man-

aged, including adequate drainage in combination with irrigation, they are suited to very intensive cropping. In addition to growing mostly corn or soybeans, high-profit crops such as sweet corn, peas, garden beans, tomatoes, and melons can be grown.

The coarse-textured material in the root zone is very permeable, causing leaching of needed nutrients. Fertilizer additions based on the needs of the specific crop will help avoid this costly loss.

Unless drainage systems have been installed, improved drainage is needed for best yields. If open ditches lower the water table below the root zone, irrigation systems will be necessary during the growing season.

If the water table is permanently lowered artificially or by dry seasons, these soils are subject to soil blowing. Wind strips that include the use of close-growing crops such as oats, alfalfa, and bromegrass in the cropping system are an effective wind erosion control practice.

If these soils are used for growing pasture, legumes and grasses such as alsike clover, timothy, or reed canarygrass are suitable for seeding. If these soils have improved drainage, alfalfa, bromegrass, birdsfoot trefoil, or orchardgrass is suitable. The soils in this unit are seldom used for woodland.

Capability Unit IIIe-1. This unit consists of dark-, moderately dark-, and light-colored predominantly strongly sloping soils. They are deep, moderately well or well drained, and have dominantly medium-textured surface soils and dominantly medium- or moderately fine-textured soils.

These soils are dominantly high in available water capacity and are primarily moderately permeable. All of the soils in this unit, except Strawn silt loam and Hamburg silt loam, have favorable natural fertility and are very productive if properly managed. The soils in this unit are subject to severe surface runoff and erosion if cultivated. The organic matter content ranges from high to very low. The soils in this unit are Argyle (227D2), Ashdale (411D2), Camden (134D2), Downs (386D, 386D2), Drury (75D2), Dubuque and Palsgrove (950C, 950C2), Durand (416D2), Eleroy and Derinda (949D2), Fayette (280D, 280D2), Flagg (419D, 419D2), Gale (413D2), Hamburg (30D2), Hitt (506D2), Keltner (546D2), Mt. Carroll (268D2), Myrtle (414D2), Ogle (412D2), Palsgrove and Woodbine (951D, 951D2), Pecatonica (21C3, 21D, 21D2), Port Byron (277D, 277D2, 277D3), Port Byron, sandy substratum (562D, 562D2), Seaton (274D, 274D2, 274D3), Seaton, sandy substratum (563D, 563D2, 563D3), Strawn (224D2), Tama (36C3, 36D, 36D2), and Worthen (37D2).

These soils are mainly used for growing corn, oats, hay or pasture, and timber. The soils in this unit are suited to moderate cropping. Row crops such as corn and soybeans can be grown in a sequence with small grain and about one-half meadow. More intertilled crops can be grown if erosion control practices are established. To maintain desirable tilth, a greater proportion of meadow to row crops will be needed on the moderately and severely eroded soils and on soils developed under a forest vegetation. (Refer to the series description of a given soil in this unit to determine its native vegetation.)

Because calcareous material is at or near the surface of the Hamburg and Strawn soils, rooting is less favorable than in the other soils in this group. Regulated fertilizer application based on needs of the crop to be grown is necessary for best yields on these high-lime soils.

In addition to conservation cropping on these soils, erosion control practices such as contour tillage, terraces, or contour stripcropping are effective for decreasing runoff.

If these soils are used for growing pasture, legumes and grasses such as alfalfa, red clover, birdsfoot trefoil, bromegrass, timothy, and orchardgrass are suitable for seeding. Information concerning the management of wooded areas and about the kinds of trees to plant is given in the section, "Use and Management of Soils for Woodland."

Capability Unit IIIe-2. This unit consists of dark- and light-colored, moderately sloping and strongly sloping soils. They are moderately deep, well drained, and have medium- to coarse-textured surface soils and moderately coarse- to moderately fine-textured subsoils.

These soils have moderately rapid permeability and moderate to low available water capacity and productivity. The soils in this unit are subject to severe surface runoff and erosion if cultivated. They have coarse-textured material in the root zone, causing drouthiness to be a secondary limitation. The natural organic matter content ranges from high to low. The soils in this unit are Ade (98C, 98D), Dickinson (87C, 87C2), Lamont (175C, 175C2, 175D, 175D2), Tell (565C, 565C2, 565D, 565D2), Tell-Lamont complex (952C, 952C2, 952D2), and Waukegan (564C, 564C2, 564D2).

These soils are used mostly for growing corn, oats, hay or pasture, and timber. The soils in this unit are suited to moderate cropping. Row crops and special crops such as corn, soybeans, or vegetable crops can be grown in a sequence with small grain and about one-half meadow. More intertilled crops can be grown if erosion control practices are established. To maintain desirable tilth, a greater proportion of meadow crops to row crops will be needed on the moderately eroded soils and on soils developed under a timber vegetation. (Refer to the series description of a given soil in this unit to determine its native vegetation.)

The coarse-textured material in the root zone is very permeable, causing leaching of needed plant nutrients. Fertilizer additions based on the needs of the specific crop will help avoid this costly loss.

Conservation cropping, in combination with erosion control practices such as contour tillage and winter cover crops, is effective for decreasing runoff.

An abundant source of water for regulated irrigation in conjunction with proper management is essential for best yields on these soils. A good crop response can be expected where irrigation is practiced.

The Ade, Dickinson, and Lamont soils in this unit are more susceptible to soil blowing than the other soils. Wind strips that include the use of close-growing crops such as oats, alfalfa, and bromegrass in the cropping system are effective in controlling wind erosion.

If these soils are used for growing pasture, legumes and grasses such as alfalfa, birdsfoot trefoil, bromegrass, timothy, or orchardgrass are suitable for seeding. Information concerning the management of wooded areas and about the kinds of trees to plant is given in the section, "Use and Management of Soils for Woodland."

Capability Unit IIIe-3. This unit consists of dark- and moderately dark-colored, moderately sloping and strongly sloping soils. They are deep, somewhat poorly drained, and have medium-textured surface soils and moderately fine- to fine-textured subsoils.

These soils have moderately slow to very slow permeability. Loran soils in the unit have higher available water capacity and higher productivity under proper management than Zwingle soils. These soils have favorable natural fertility and high to low organic matter content. The soils in this unit are subject to severe surface runoff and erosion if cultivated. These soils have a high water table during part of the year, and seasonal wetness is a limitation. The soils in this unit are Loran (572D, 572D2) and Zwingle (576C).

These soils are used mostly for growing corn, oats, hay or pasture, and timber. The soils in this unit are suited to moderate cropping. Row crops such as corn and soybeans can be grown in a sequence with small grain and one-half meadow. More row crops can be grown if erosion control practices such as terraces and contour tillage are used to reduce runoff. To maintain desirable tilth, a greater proportion of meadow to row crops will be needed on the moderately eroded Loran soil and on Zwingle soil, which was formed under a timber cover.

If these soils need additional drainage as an improvement measure for increased production and ease of operation, tile will function slowly on Loran soil. Because Zwingle soil has very slow permeability, it is limited for tile drainage, and engineering assistance will be needed to design and install special drainage systems.

If these soils are used for growing pasture, legumes and grasses such as alfalfa, birdsfoot trefoil, timothy, bromegrass, orchardgrass, or red, ladino, or alsike clover are suitable for seeding. Information concerning the management of wooded areas and about the kinds of trees to plant is given in the section "Use and Management of Soils for Woodland."

Capability Unit IIIw-1. This unit consists of dark- and moderately dark-colored, nearly level and gently sloping soils. They are deep, poorly and somewhat poorly drained, and have medium- or moderately fine-textured surface soils and fine-textured subsoils.

These soils are slowly to very slowly permeable and have a moderate available water capacity and productivity. They have favorable natural fertility. The organic matter content is lower in Zwingle soils than in the other soils in the unit. Unfavorable permeability, which causes wetness, is a permanent limitation of these soils. The soils in this unit are Niota (261), Niota, clayey subsurface variant (568A, 568B), and Zwingle (576A, 576B).

These soils are used mostly for growing corn, oats, hay or pasture, and timber. If these soils are properly managed, including adequate drainage, they are suited to very intensive cropping. Row crops such as corn and soybeans can be grown using legumes and grasses such as alsike clover and timothy to maintain a favorable air and water relationship in the soil.

Unless drainage systems have been installed, improved drainage is required for higher yields and ease of tillage operations. All the soils in the unit have slow to very slow permeability. Open ditches must be used to remove excess surface water.

If these soils are used for growing pasture, legumes and grasses such as alsike or ladino clover, birdsfoot trefoil, timothy, or reed canarygrass are suitable for seeding. Information concerning the management of wooded areas and about the kinds of trees to plant is given in the section, "Use and Management of Soils for Woodland."

Capability Unit IIIw-2. This unit consists of dark-colored, nearly level organic soils that are deep and very poorly drained.

These soils have moderate permeability and very high available water capacity. They are highly productive if the water table level is adjusted as necessary for favorable rooting. Because these soils are organic in nature, they have a higher organic matter content than any other soils in the county. Wetness and frequent overflow are permanent hazards on these soils. If the water table is lowered below the root zone, drouthiness will be a secondary limitation. The soils in this unit are Lena muck (210) and Palms muck (100).

These soils are mostly used for growing corn or for pasture. If these soils are properly managed, including adequate drainage in combination with irrigation, they are suited to very intensive cropping. In addition to growing corn or soybeans, high-profit crops such as potatoes, onions, lettuce, or celery can be grown.

The Lena soil in this unit has unfavorable natural fertility because of its high lime content. Lime reduces the availability of phosphorus and most of the minor nutrients. Superphosphate applied periodically to this high-lime soil will be more readily available to the crops than infrequent bulk additions. If these muck soils are excessively drained, fertilizer applied as needed by the specific crop will help avoid nutrient leaching.

Unless drainage systems have been installed, improved drainage is needed for best yields. Perforated long tile are more satisfactory than regular field tile because the shorter tile can move or settle out of alignment. If tile drainage lowers the water table below the root zone, irrigation systems will be necessary during the growing season.

If the water table is permanently lowered artificially or by dry seasons, these muck soils are subject to soil blowing. Wind strips that include the use of close-growing crops such as grass and legumes in the cropping system are an effective wind erosion control practice. Artificial flooding after the crops are harvested will temporarily prevent muck from drying out and being blown by the wind.

If these soils are used for growing pasture, legumes and grasses such as alsike clover, timothy, or reed canarygrass are suitable for seeding. If these soils have improved drainage, alfalfa, bromegrass, birdsfoot trefoil, or orchardgrass is suitable for seeding. The soils in this unit are seldom used for woodland.

Capability Unit IIIs-1. This unit consists of dark- to light-colored, nearly level and gently sloping soils. They are sandy, well drained, and have moderately coarse-textured surface soils and predominately moderately coarse-textured subsoils or subsurfaces.

These soils have moderately rapid permeability, moderate to low available water capacity, and low productivity. The soils in this unit have coarse-textured material in the root zone, causing drouthiness to be the main limitation. The organic matter content is lower in Lamont soil than in the other soils in the unit. The soils in this unit are Ade (98A, 98B), Dickinson (87A, 87B), and Lamont (175B).

These soils are used mostly for growing corn, oats, hay or pasture, and trees. If these soils are properly managed, including irrigation, they are suited to very intensive cropping. In addition to growing mostly corn or soybeans, high-profit crops such as sweet corn, peas, garden beans, tomatoes, and melons can be grown.

The coarse-textured material in the root zone is very permeable, causing leaching of needed plant nutrients. Fertilizer additions based on the needs of the specific crop will help avoid this costly loss.

An abundant source of water for regulated irrigation in conjunction with proper management is essential for best yields on these soils. A good crop response can be expected where irrigation is practiced.

All the soils in this group are susceptible to soil blowing. Wind strips that include close-growing crops such as oats, alfalfa, and bromegrass in the cropping system are effective for wind erosion control.

If these soils are used for growing pasture, legumes and grasses such as alfalfa, birdsfoot trefoil, bromegrass, timothy, or orchardgrass are suitable for seeding. Information concerning the management of wooded areas and the kinds of trees to plant is given in the section, "Use and Management of Soils for Woodland."

Capability Unit IVe-1. This unit consists of dark-, moderately dark-, and light-colored, strongly sloping and very strongly sloping soils. They are deep, moderately well or well drained, and have medium- or moderately fine-textured surface soils and dominantly medium- or moderately fine-textured subsoils.

These soils are dominantly high in available water capacity and are primarily moderately permeable. All the soils in this unit except Strawn silt loam and Timula silt loam have favorable natural fertility and are very productive if properly managed. The soils in this unit are subject to very severe surface runoff and erosion if cultivated. The organic matter content ranges from moderate to very low. The soils in this unit are Argyle (227E2), Camden (134E2), Downs (386E, 386E2), Drury (75E2), Dubuque and Palsgrove (950D, 950D2), Durand (416D3, 416E2), Eleroy and Derinda (949D3, 949E2), Fayette (280D3, 280E, 280E2), Flagg (419D3, 419E2), Hitt (506D3, 506E2), Keltner (546E2), Ogle (412D3, 412E2), Palsgrove and Woodbine (951D3, 951E, 951E2), Pecatonica (21D3, 21E, 21E2), Seaton (274E, 274E2, 274E3), Seaton, sandy substratum (563E3), Strawn (224E2), Tama (36D3, 36E2), and Timula (271E2).

These soils are used mainly for growing corn, oats, hay or pasture, and timber. The soils in this unit are suited to hayland cropping. Forage crops such as alfalfa, red clover, bromegrass, timothy, or orchardgrass can be grown using corn or soybeans and small grain as needed to reestablish hayland. More row crops can be grown if erosion control practices are established. Elimination of the row crop when reestablishing meadow will help improve tilth on the moderately and severely eroded soils and on soils developed under a forest vegetation. (Refer to the series description of a given soil to determine its native vegetation.)

Because calcareous material is near the surface of Strawn and Timula soils, rooting is less favorable than in the other soils in this group. Regulated fertilizer application based on crop needs is necessary for best yields on these high-lime soils. Legumes are heavy feeders of calcium, and root penetration into the calcareous material is greater than for small grains and row crops.

If higher profit row crops are needed, conservation practices such as contour tillage or contour stripcropping are effective for decreasing runoff and erosion.

If these soils are used for growing permanent pasture, legumes and grasses such as those used in hayland cropping are suitable for pasture planting or renovation. Information concerning the management of wooded areas and about the kinds of trees to plant is given in the section, "Use and Management of Soils for Woodland."

Capability Unit IVe-2. This unit consists of moderately dark- and light-colored, strongly sloping and very strongly sloping soils. They are dominantly moderately deep, well drained, and have medium- or moderately coarse-textured surface soils and moderately coarse- to moderately fine-textured subsoils.

These soils have low available water capacity and are moderately to moderately rapidly permeable. All the soils in this unit, except the Casco-Fox complex, have favorable natural fertility. All these soils have low productivity but will respond well to good management. The soils in this unit are subject to very severe runoff and erosion if cultivated. They have coarse or solid rock material in the root zone, which causes drouthiness to be a secondary limitation. The organic matter content ranges from moderate to low. The soils in this unit are Casco-Fox complex (972D2), Dickinson (87E2), Dunbarton (505D2), Lamont (175D3, 175E2), Tell (565D3, 565E2), Tell-Lamont complex (952D3, 952E2), and Waukegan (564E2).

These soils are used mostly for growing corn, oats, hay or pasture, and timber. The soils in this unit are suited to hayland cropping. Forage crops such as alfalfa and bromegrass can be grown using corn or soybeans and small grain as needed to reestablish hayland. More row crops can be grown if erosion control practices are established. Elimination of the row crop when reestablishing meadow will help improve tilth on the moderately and severely eroded soils and on soils developed under a forest vegetation. (Refer to the series description of a given soil in this unit to determine native vegetation.)

The coarse-textured material and cracks in the bedrock are very permeable and cause leaching of needed plant nutrients. Fertilizer additions based on the needs of the specific crop will help avoid this loss. The calcareous gravel near the surface of Casco and Fox soils causes less favorable rooting than in the other soils in this group. Legumes are heavy feeders of calcium, and root penetration into the calcareous gravel is greater than for row crops and small grains.

If higher profit row crops are needed, conservation practices such as contour tillage or contour stripcropping are effective for controlling runoff and erosion.

An abundant source of water for regulated irrigation in conjunction with proper management is essential for best yields on these soils. A good crop response can be expected where irrigation is practiced.

If these soils are used for growing permanent pasture, legumes and grasses such as alfalfa, red clover, birdsfoot trefoil, bromegrass, timothy, or orchardgrass are suited for pasture planting or renovation. Information concerning the management of wooded areas and about the kinds of trees to plant is given in the section, "Use and Management of Soils for Woodland."

Capability Unit IVe-3. This unit consists of moderately dark-colored, strongly sloping soils. They are deep, somewhat poorly drained, and have medium-textured surface soils and fine-textured subsoils.

These soils have moderate available water capacity and are slowly permeable. The soils in this unit have favorable natural fertility and are moderately productive. They have moderate organic matter content. These soils are subject to very severe runoff and erosion if cultivated. These soils have a high water table during part of the year, and seasonal wetness is a limitation. The only soils in this unit are Coatsburg (660D2).

These soils are used mainly for growing corn, oats, and hay or pasture. They are suited to hayland cropping. Forage crops such as alfalfa, alsike clover, bromegrass, timothy, reed canarygrass, or orchardgrass can be grown using corn or soybeans and small grain as needed to reestablish hayland. More row crops can be grown if erosion control practices are established. Elimination of the row crop when reestablishing meadow will help improve tilth.

If higher profit row crops are needed, conservation practices such as contour tillage or contour stripcropping are effective for controlling runoff and erosion.

If these soils need additional drainage as an improvement measure for increased production and ease of operation, engineering assistance will be required to design and install special drainage systems.

If these soils are used for growing permanent pasture, legumes and grasses such as alfalfa, birdsfoot trefoil, timothy, bromegrass, orchardgrass, or red, ladino, or alsike clover are suitable for pasture planting or renovation. Information about the kinds of trees to plant is given in the section, "Use and Management of Soils for Woodland."

Capability Unit IVs-1. This unit consists of dark- to light-colored, nearly level to moderately sloping soils. They are sandy, well drained, and have coarse-textured surface soils and predominantly coarse-textured subsurfaces.

These soils have rapid permeability and very low available water capacity and productivity. The soils in this unit have coarse-textured material throughout the root zone, which causes drouthiness to be the outstanding limitation. The organic matter content is lower in Bloomfield soil than in the other soils in the unit. The soils in this unit are Bloomfield (53B) and Sparta (88A, 88B, 88C, 88C2).

These soils are used mostly for growing corn, oats, meadow, and trees. These soils are suited to hayland cropping. Hay crops such as alfalfa and bromegrass can be grown using small grain to reestablish hayland. If higher profit crops such as vegetables and melons

are desired, improved management including irrigation and wind erosion control measures is necessary.

The coarse-textured material throughout the root zone is very permeable and causes leaching of needed plant nutrients. Fertilizer additions based on the needs of the specific crop will help avoid this costly loss.

An abundant source of water for regulated irrigation in conjunction with proper management is essential for best yields on these soils. A good crop response can be expected where irrigation is properly practiced.

These soils are susceptible to soil blowing. Wind strips that include close-growing crops such as oats, alfalfa, and bromegrass in the cropping system are effective for controlling wind erosion.

If these soils are used for growing permanent pasture, legumes and grasses such as alfalfa, birdsfoot trefoil, bromegrass, timothy, or orchardgrass are suitable for pasture planting or renovation. Information concerning the management of wooded areas and about the kinds of trees to plant is given in the section, "Use and Management of Soils for Woodland."

Capability Unit Vw-1. This unit consists of dark-colored, nearly level soils. They are deep and poorly to somewhat poorly drained. The surfaces and subsurfaces have muck, moderately coarse, medium, or moderately fine textures.

These soils have moderately rapid to moderately slow permeability and moderate to very high available water capacity. The soils in this unit are inherently productive and have high organic matter content. Wetness and frequent overflow, impractical to correct by drainage, are permanent limitations of these soils. The soils in this unit are Dorchester, wet ($\overline{239A}$), Hoopeston, wet ($\overline{237}$), Lawson, wet ($\overline{451}$), Lena, wet ($\overline{210}$), Millington, wet ($\overline{82}$), Otter, wet ($\overline{76}$), Palms, wet ($\overline{100}$), and Sawmill, wet ($\overline{107}$).

These soils are used mostly for growing pasture in late summer and fall. Some areas remain as a habitat for water-loving wildlife. Because of the wetness and overflow limitations, cultivation of the common crops is not feasible. In most areas pastures can be improved and benefits from proper management can be expected.

If these soils are used for growing pasture, they will have favorable natural fertility. Legumes are heavy feeders of calcium, which is naturally available in Millington, Lena, and Dorchester soils. Periodic application of limestone, based on test results, will be required for best pasture yields on the other soils in the unit.

Legumes and grasses such as alsike or ladino clover, birdsfoot trefoil, timothy, and reed canarygrass are suitable for pasture planting or renovation. Information about the management of wooded areas is given in the section, "Use and Management of Soils for Woodland." Information concerning managing the soils for wildlife is given in the section, "General Management of Soils for Wildlife."

Capability Unit VIe-1. This unit consists of moderately dark- and light-colored, very strongly sloping and steep soils. They are deep, moderately well or well drained, and have medium- or moderately fine-textured surface soils and dominantly medium- or moderately fine-textured subsoils.

These soils are mostly high in available water capacity and are primarily moderately permeable. They are inherently productive but are subject to very severe runoff and erosion if cultivated. The organic matter content ranges from moderate to very low. The soils in this unit are Ashdale (411E3), Drury (75F2), Dubuque and Palsgrove (950D3, 950E, 950E2), Durand (416E3), Eleroy and Derinda (949-E3, 949F2), Fayette (280E3, 280F, 280F2, 280F3), Flagg (419E3), Gale (413F2), Hamburg (30F2), Hitt (506F2), Keltner (546E3, 546F2), Palsgrove and Woodbine (951E3, 951F, 951F2, 951F3), Pecatonica (21E3, 21F, 21F2, 21F3), Seaton (274F, 274F2, 274-F3), Strawn (224E3, 224F2, 224F3), Sylvan (19E3, 19F2, 19F3), Tama (36E3), and Timula (271F2).

These soils are used mostly for growing hay, pasture, and timber. They are not suited for cultivated crops because the slopes are too steep and the erosion hazard is very severe. Permanent cover is essential for effective erosion control.

All these soils will have favorable natural fertility if they are used for growing pasture. Legumes are heavy feeders of calcium, which is naturally available in the root zones of Hamburg, Strawn, Sylvan, and Timula soils in the unit. Periodic additions of limestone, based on soil tests, will be needed for best pasture yields on the other soils.

Legumes and grasses such as alfalfa, red clover, bromegrass, timothy, orchardgrass, or birdsfoot trefoil are suitable for pasture planting or renovation. Information concerning the management of wooded areas and about the kinds of trees to plant is given in the section, "Use and Management of Soils for Woodland."

Capability Unit VIe-2. This unit consists of moderately dark- and light-colored, strongly sloping to steep soils. They are shallow and moderately deep, well drained, and have moderately coarse- to moderately fine-textured surface and subsoils.

These soils are low in available water capacity and have moderately rapid to moderately slow permeability. Favorable productivity on these soils is dependent on adequate rainfall. The organic matter content ranges from moderate to very low. These soils are subject to very severe runoff and erosion if cultivated. They have coarse-textured or solid bedrock material in the root zone, which causes drouthiness to be a secondary limitation. The soils in this unit are Casco-Fox complex (972E2), Dunbarton (505D3, 505E, 505E2), Lamont (175E3, 175F2), Tell (565E3, 565F2), and Tell-Lamont complex (952E3, 952F, 952F2).

These soils are used mostly for growing hay, pasture, and timber. They are not suited for cultivated

crops because the erosion hazard is very severe, some of the soils have a shallow rooting zone, all have some degree of drouthiness, and some are too steep. Permanent cover is necessary for effective erosion control.

All these soils will have favorable natural fertility if they are used for growing pasture. Legumes are heavy feeders of calcium, which is naturally available in the root zones of Casco and Fox soils. Periodic additions of limestone, based on soil tests, will be needed for best pasture yields on the other soils in the unit.

If these soils are used for growing permanent pasture, legumes and grasses such as alfalfa, red clover, birdsfoot trefoil, bromegrass, timothy, or orchardgrass are suited for pasture planting or renovation. Information concerning the management of wooded areas and about the kinds of trees to plant is given in the section, "Use and Management of Soils for Woodland."

Capability Unit VIe-3. This unit consists of moderately dark- to light-colored, strongly sloping and very strongly sloping soils. They are deep, somewhat poorly drained, and have medium- or moderately fine-textured surface soils and fine-textured subsoils.

These soils have moderate available water capacity and are slowly permeable. The soils in this unit have favorable natural fertility and are moderately productive. These soils are subject to very severe runoff and erosion if cultivated. They have a high water table during part of the year, and seasonal wetness is a limitation. The organic matter content ranges from moderate to very low. The soils in this unit are Coatsburg (660D3, 660E2).

These soils are used mainly for growing corn, oats, hay, or pasture. They are not suited for cultivated crops because the runoff and erosion hazard is more severe on these slowly permeable soils than on soils having more rapid permeability.

If these soils need additional drainage as an improvement for good pasture management, engineering assistance will be necessary to design and install special drainage systems.

If these soils are used for growing permanent pasture, legumes and grasses such as alfalfa, birdsfoot trefoil, timothy, bromegrass, orchardgrass, or red, ladino, or alsike clover are suitable for pasture planting or renovation. Information about the kinds of trees to plant is given in the section, "Use and Management of Soils for Woodland."

Capability Unit VIs-1. This unit consists of dark- to light-colored, strongly sloping to very strongly sloping soils that are well to excessively drained. They have medium- to coarse-textured surface soils and very shallow limestone bedrock or sandy or gravelly underlying material.

These soils have moderate to rapid permeability and low to very low available water capacity and productivity. The soils in this unit have coarse-textured or solid bedrock material in the root zone, which causes drouthiness or shallow rooting, or both, to be the outstanding limitations. Erosion is a secondary hazard. The organic matter content ranges from moderate to low. The soils in this unit are Bloomfield (53D), Rodman (93E2), Sogn (504E2), and Sparta (88D).

These soils are used mostly for growing corn, oats, meadow, and trees. They are not suited for cultivated crops because all are very drouthy, some have a very shallow rooting zone, and all are subject to erosion. Permanent cover is necessary for effective soil and water conservation.

Legumes are heavy feeders of calcium, which is naturally available throughout the root zones of Rodman and Sogn soils. Periodic additions of limestone, based on soil tests, will be required for best pasture yields on the sandy soils in the unit.

If these soils are used for growing permanent pasture, legumes and grasses such as alfalfa, red clover, birdsfoot trefoil, bromegrass, timothy, or orchardgrass are suitable for pasture planting or renovation. Information concerning the management of wooded areas and about the kinds of trees to plant is given in the section, "Use and Management of Soils for Woodland."

Capability Unit VIIe-1. This unit consists of light-colored, predominantly very steep soils. They are deep, well drained, and have medium- or moderately fine-textured surface soils and dominantly medium- or moderately fine-textured subsoils.

These soils are mostly high in available water capacity and are primarily moderately permeable. They are inherently productive but are subject to very severe runoff and erosion if cultivated or pastured. The organic matter content is low to very low. The soils in this unit are Dubuque and Palsgrove (950E3, 950F, 950F2, 950F3, 950G, 950G2), Fayette (280G, 280G2), Hamburg (30G2), Palsgrove and Woodbine (951G2, 951G3), Seaton (274G2), Sylvan (19G2, 19G3), and Timula (271G2).

These soils are used mostly for growing pasture or timber. They are not suited for cultivated crops or pasture because the slopes are mainly very steep or steep and the erosion hazard is very severe. Permanent cover is essential for controlling erosion.

Information concerning the management of wooded areas and the kinds of trees to plant is given in the section, "Use and Management of Soils for Woodland."

Capability Unit VIIe-2. This unit consists of light-colored, very strongly sloping to very steep soils. They are shallow and moderately deep, well drained, and have moderately coarse- to moderately fine-textured surface and subsoils.

These soils are low in available water capacity and have moderately rapid to moderately slow permeability. Favorable productivity on these soils is dependent on adequate rainfall. The organic matter content ranges from low to very low. These soils are subject to very severe runoff and erosion if cultivated. They have coarse-textured or solid bedrock material in the

root zone, which causes drouthiness to be a secondary limitation. The soils in this unit are Casco-Fox complex (972E3), Dunbarton (505E3, 505F, 505F2, 505F3, 505G, 505G2, 505G3), Dunbarton, cherty variant (511E3, 511F, 511F3, 511G2), Lamont (175F3), Tell (565F3), and Tell-Lamont complex (952F4).

These soils are used mostly for growing pasture or timber. They are not suited for cultivated crops because the erosion hazard is very severe, all have some degree of drouthiness, most of the soils have a shallow rooting zone, and all are too steep. The gullied and the very steep soils are not suited for pasture but if properly managed are suitable for productive timber. Permanent cover is necessary on all these soils for effective erosion control.

The very strongly sloping and steep soils have favorable natural fertility if they are used for pasture. Legumes are heavy feeders of calcium, which is naturally available in Casco and Fox soils. Periodic additions of limestone, based on soil tests, will be needed for the best pasture yields on the other very strongly sloping and steep soils in the unit.

If the very strongly sloping and steep soils are used for growing permanent pasture, legumes and grasses such as alfalfa, red clover, birdsfoot trefoil, bromegrass, timothy, or orchardgrass are suited for pasture planting or renovation. Information concerning the management of wooded areas and about the kinds of trees to plant is given in the section, "Use and Management of Soils for Woodland."

Capability Unit VIIe-3. This unit consists of dark- to light-colored, strongly sloping to steep soils. They are deep and have variable drainage but in most places are somewhat poorly drained. They are variable in texture but in most places have medium- or moderately fine-textured surface soils and fine-textured subsoils.

These soils have moderate available water capacity and are very slowly to slowly permeable. The soils in this unit have favorable natural fertility and are moderately productive. These soils are subject to very severe runoff and erosion if cultivated. In some places these soils have a high water table during part of the year, and seasonal wetness is a limitation. The organic matter content ranges from low to very low. The soils in this unit are Coatsburg (660E3) and Terrace Escarpments (577D, 577E, 577F).

These soils are used mostly for growing corn, oats, hay or pasture, and timber. They are not suited for cultivated crops because the runoff and erosion hazard is more severe on these slowly permeable soils than on soils having more rapid permeability.

If these soils need additional drainage as an improvement for good pasture management, engineering assistance will be necessary to design and install special drainage systems.

If these soils are used for growing permanent pasture, legumes and grasses such as alfalfa, birdsfoot trefoil, timothy, bromegrass, orchardgrass, or red, ladino, or alsike clover are suitable for pasture planting or renovation. Information concerning the management of wooded areas and about the kinds of trees to plant is given in the section, "Use and Management of Soils for Woodland."

Capability Unit VIIw-1. This unit consists of mostly dark-colored, nearly level soil that is deep and mainly poorly drained. The surfaces and subsurfaces range from coarse to fine textures.

This soil has rapid to slow permeability and low to high available water capacity. Most of the areas in the unit are inherently productive and have high organic matter content. Wetness caused by repeated overflow and water tables at or near the surface during most of the year are permanent limitations of these areas. Inaccessibility and deposition of undesirable sediment such as sand are also permanent disadvantages of this soil. The soil in this unit is Mixed Alluvial Land (455).

This soil is used mainly for growing woodland. In some places the water table is not permanently high, and soft maple, elm, ash, and oak occupy the soil. In other places the water table is permanently high, and cottonwood, poplar, and willow grow there. Some areas remain as a habitat for water-loving wildlife. Because of the wetness, overflow, and inaccessibility limitations, cultivation of the common crops and growing pasture are not feasible except in the few areas that are accessible and flood only occasionally.

Information about the management of wooded areas is given in the section, "Use and Management of Soils for Woodland." Information concerning managing the soils for wildlife is given in the section, "General Management of Soils for Wildlife."

Capability Unit VIIs-1. This unit consists of dark- to light-colored, gently sloping to very steep soils that are well to excessively drained. They have medium- and coarse-textured surface soils and very shallow limestone bedrock or very sandy underlying material.

These soils have moderate to rapid permeability, low to very low available water capacity, and low productivity. The soils in this unit have coarse-textured or solid bedrock material in the root zone, which causes drouthiness or shallow rooting, or both, to be the outstanding limitations. Erosion is a secondary hazard. The organic matter content ranges from moderate to very low. The soils in this unit are Bloomfield (53F), Blown-Out Land (63), Chute (282E3, 282F3), Plainfield (54B, 54C3, 54F2), Sogn (504G2), and Sparta (88E).

These soils are used mainly for growing pasture and timber. Under ordinary management they are not suited to cultivated crops because all are very drouthy, some have a very shallow rooting zone, all are subject to erosion, and some are very steep. Permanent cover is necessary for effective soil and water conservation.

Unless the sandy soils in the unit are too steep for operating machinery, they can be used for growing special crops. Regulated irrigation and fertilization in conjunction with proper management will be essential if special crops are grown. High-profit crops such as sweet corn, peas, garden beans, tomatoes, and melons can be expected to respond well if this high level of management is practiced.

The soils used for growing special crops and not under grass or trees are susceptible to soil blowing. Wind strips that include close-growing crops such as small grain, alfalfa, and bromegrass in the cropping system are effective for wind erosion control.

Legumes are heavy feeders of calcium, which is naturally available throughout the root zones of Chute and Sogn soils. Periodic additions of limestone, based on test results, will be required for best pasture yields on the other soils in the unit.

The very steep Sogn soil in the group is not suited for pasture, but trees will control soil erosion. If the other soils in the group are used for permanent pasture, legumes and grasses such as alfalfa, red clover, birdsfoot trefoil, bromegrass, timothy, or orchardgrass are suitable for pasture planting or renovation. Information concerning the management of wooded areas and the kinds of trees to plant is given in the section, "Use and Management of Soils for Woodland."

Crop Yields and Productivity

Average crop yields under a *high level of management* are given in Table 4 for each mapping unit for crops well adapted for the respective units. A high level of management is defined briefly here. The reader who is interested in more detailed information should consult Illinois Extension Circular 1016, "Productivity of Illinois Soils" (*14*).

The high level of management is based on production input levels thought to be required for maximum profit. This level is based on most recent technology used by about 10 percent of farm operators.

The management inputs include drainage improvement consistent with soil properties and economic considerations. Soil reaction is maintained at pH levels of 6.0 to 6.5. Available phosphorus (P-1) test levels are maintained at 40 to 50, and available potassium test levels are maintained at a minimum of 240. Nitrogen application rates are 125 to 175 pounds per acre per year for corn. Corn plant populations are 24,000 to 20,000 plants per acre, adjusted downward for soils with low water-supplying capacities. Erosion control practices are used as needed to insure the soil will not be seriously damaged. Weed and insect control is timely and adequate. Tillage operations are adequate for the soil and the crop. Excessive tillage is avoided.

The yields for a high level of management are based on recent yields obtained at high-input levels at agronomy research centers and research fields in Illinois. The yields shown for Carroll County in Table 4 are based on yields in Circular 1016 (*14*), using adjustment percentages for different slope and erosion classes.

Use and Management of Soils for Woodland[1]

Most of the forest has been cleared since pioneer settlement began. According to the Illinois Soil and Water Conservation Needs Inventory published in 1970, Carroll County had 20,000 acres of forest in 1967. This makes up about 7 percent of the land area.

Because most trees were cleared from soils suitable for crops, the remaining trees are mainly on soils that are unsuitable for cultivation. These soils are either steep, wet, or inaccessible. The largest continuous forests are on Mixed Alluvial Land in the Mississippi River Valley and on Dunbarton, Dubuque, Fayette, Palsgrove, Seaton, and Woodbine soils, which occupy steep slopes bordering the minor stream valleys and the Mississippi Valley.

The main species on the bottomlands are cottonwood, sycamore, pin oak, and green ash. The main species on the uplands are white oak, red oak, black oak, and hickory.

In Table 5 the soils of Carroll County are placed in 15 woodland suitability groups (*13*). Each group consists of soils that are capable of producing similar kinds of wood crops, that need similar management to produce these crops when the vegetation is similar, and that have about the same potential productivity.

The potential productivity of a soil for a given species is commonly expressed as the site index. It is the height in feet that the dominant trees of a given species, growing on a specified soil, will reach at a specified age. The site index for cottonwood is based on height at 30 years of age (*1*); for other species, the basis is height at 50 years of age.

The estimated average annual growth per acre is given in board feet measured by the Doyle Rule. The estimates are based on data from well-stocked, well-managed stands of upland oaks, pin oak, yellow poplar, and cottonwood (*16* and *20*). Red oak and white oak were used to estimate the rate of growth for all upland oaks.

Five limitations that affect the growth or management of trees are rated in Table 5 (pages 80 to 83).

Erosion hazard refers to the risk of erosion in properly managed stands. Length and steepness of slopes, soil textures, and permeability are among the factors considered. *Slight* means that erosion is not a major problem. *Moderate* indicates that management is needed to prevent erosion during harvesting operations and in cleared areas. *Severe* indicates that intensive management is required to control erosion.

[1] This section was prepared primarily by William Clark, Woodland Conservationist, Soil Conservation Service.

TABLE 4. — ESTIMATED AVERAGE ACRE YIELDS OF PRINCIPAL CROPS UNDER A HIGH LEVEL OF MANAGEMENT[a] AND ESTIMATED ACREAGES[b] OF MAPPING UNITS AND SOIL SERIES

Soil series	Map symbol	Corn, bu.	Soybeans, bu.	Oats, bu.	Alfalfa hay, tons	Mixed pasture, days[c]	Mapping unit, acres	Soil series, acres
Sylvan	19E3	N[d]	N	40	3.0	150	221	
	19F2	N	N	38	2.8	140	105	
	19F3	N	N	36	2.6	130	345	
	19G2	N	N	N	N	N	145	
	19G3	N	N	N	N	N	150	966
Pecatonica	21B	97	30	56	4.0	200	125	
	21C	95	30	55	3.9	195	170	
	21C2	86	27	50	3.6	180	260	
	21C3	82	25	47	3.4	170	60	
	21D	93	28	53	3.8	190	115	
	21D2	82	26	47	3.4	170	1,015	
	21D3	78	23	44	3.2	160	625	
	21E	89	27	51	3.6	180	240	
	21E2	79	24	45	3.2	160	505	
	21E3	N	N	42	3.0	150	755	
	21F	N	N	46	3.3	165	280	
	21F2	N	N	40	2.9	145	440	
	21F3	N	N	37	2.7	125	225	4,815
Hamburg	30D2	45	15	40	2.7	130	30	
	30F2	N	N	34	2.3	115	30	
	30G2	N	N	N	N	N	186	246
Tama	36A	137	42	82	5.5	275	2,795	
	36B	135	41	81	5.4	270	43,585	
	36B2	126	38	75	5.0	250	140	
	36C	132	40	79	5.3	265	14,380	
	36C2	119	37	71	4.8	240	13,860	
	36C3	111	34	66	4.4	220	80	
	36D	126	38	75	5.0	250	240	
	36D2	114	35	68	4.6	230	4,180	
	36D3	105	32	63	4.2	210	2,175	
	36E2	107	32	64	4.3	215	110	
	36E3	N	N	60	4.0	200	115	81,660
Worthen	37A	130	40	77	5.4	270	905	
	37B	127	39	75	5.3	265	1,625	
	37C	125	38	74	5.2	260	465	
	37D2	108	33	64	4.5	230	69	3,064
Muscatine	41A	145	46	86	5.6	280	1,365	
	41B	142	45	84	5.5	275	539	1,904
Bloomfield	53B	67	26	44	2.8	135	170	
	53D	N	N	42	2.6	130	135	
	53F	N	N	36	2.3	110	210	515
Plainfield	54B	N	N	34	2.0	110	75	
	54C3	N	N	29	1.7	90	75	
	54F2	N	N	25	1.5	80	161	311
Atterberry	61A	130	40	77	5.1	255	1,395	
	61B	127	39	75	5.0	250	513	1,908
Blown-Out Land	63	N	N	N	N	N	187	187

(Footnotes given at end of table.)

TABLE 4 (cont.).

Soil series	Map symbol	Corn, bu.	Soybeans, bu.	Oats, bu.	Alfalfa hay, tons	Mixed pasture, days[c]	Mapping unit, acres	Soil series, acres
Sable	68	136	46	77	5.1	255	375	
	68+	136	46	77	5.1	255	284	659
Drury	75B	104	35	66	4.3	220	485	
	75C	102	34	65	4.2	215	240	
	75C2	92	30	57	3.8	195	65	
	75D2	88	29	55	3.6	185	64	
	75E2	84	27	52	3.5	180	40	
	75F2	N	N	47	3.1	160	150	1,044
Otter	76	120	40	60	4.2	210	1,454	
	$\overline{76}$	N	N	N	N	200	1,270	2,727
Huntsville	77	128	43	75	5.2	260	310	310
Littleton	81A	133	42	79	5.4	270	2,645	
	81B	130	41	77	5.3	265	745	
	81C	128	40	76	5.2	260	47	3,437
Millington	82	113	36	61	4.2	210	355	
	$\overline{82}$	N	N	N	N	200	80	435
Dickinson	87A	84	30	57	3.5	175	1,070	
	87B	82	29	56	3.4	170	420	
	87C	81	29	55	3.4	170	160	
	87C2	73	26	50	3.0	150	95	
	87E2	66	24	45	2.8	140	144	1,889
Sparta	88A	76	27	50	3.1	155	2,765	
	88B	74	26	49	3.0	150	2,730	
	88C	73	26	48	3.0	150	615	
	88C2	66	23	44	2.7	135	135	
	88D	N	N	46	2.9	145	150	
	88E	N	N	40	2.5	125	258	6,653
Rodman	93E2	N	N	26	1.9	90	86	86
Ade	98A	82	30	55	3.5	175	1,265	
	98B	80	29	54	3.4	170	525	
	98C	79	29	53	3.4	170	155	
	98D	73	27	49	3.1	155	62	2,007
Palms	100	100	33	N	N	165	301	
	$\overline{100}$	N	N	N	N	150	40	341
Sawmill	107	125	41	67	4.9	245	2,260	
	$\overline{107}$	N	N	N	N	235	535	
	107+	125	41	67	4.9	245	1,152	3,947
Selma	125	118	40	69	4.5	225	293	293
Camden	134A	106	35	64	4.5	225	60	
	134B	104	34	63	4.4	220	220	
	134C	102	34	61	4.3	215	95	
	134C2	92	30	56	3.9	195	75	
	134D2	88	29	53	3.7	185	99	
	134E2	84	28	51	3.6	180	40	589

TABLE 4 (cont.).

Soil series	Map symbol	Corn, bu.	Soybeans, bu.	Oats, bu.	Alfalfa hay, tons	Mixed pasture, days[c]	Mapping unit, acres	Soil series, acres
Drummer	152	134	46	75	5.0	250	450	450
Hoopeston (sandy loam)	172	91	30	64	3.7	185	140	140
Lamont	175B	70	28	49	3.2	160	165	
	175C	68	27	48	3.1	155	135	
	175C2	62	24	44	2.8	140	80	
	175D	66	26	47	3.0	150	80	
	175D2	59	23	42	2.7	135	150	
	175D3	55	22	39	2.5	125	70	
	175E2	56	22	40	2.5	125	180	
	175E3	N	N	37	2.4	120	80	
	175F2	N	N	36	2.3	115	1,028	
	175F3	N	N	33	2.1	105	85	2,053
Gilford	201	96	35	62	3.7	185	153	153
Lena	210	109	37	N	N	180	88	
	$\overline{210}$	N	N	N	N	170	30	118
Strawn	224C2	78	23	44	3.0	150	40	
	224D2	75	22	42	2.8	140	65	
	224E2	71	21	40	2.7	135	84	
	224E3	N	N	38	2.5	125	165	
	224F2	N	N	36	2.4	120	40	
	224F3	N	N	34	2.2	110	80	474
Argyle	227B	100	33	61	4.1	205	95	
	227C	96	32	60	4.0	200	245	
	227C2	87	30	54	3.7	185	285	
	227D2	83	28	51	3.5	175	610	
	227E2	79	26	48	3.2	165	80	1,315
Hoopeston (loam)	237	94	32	66	3.9	195	315	
	237+	94	32	66	3.9	195	200	
	$\overline{237}$	N	N	N	N	185	293	808
Dorchester	239A	112	37	66	4.7	235	8,640	
	$\overline{239A}$	N	N	N	N	225	245	
	239B	109	36	65	4.6	230	298	9,183
Niota	261	75	27	50	3.0	150	673	673
Mt. Carroll	268B	111	36	71	4.7	235	250	
	268C	109	35	70	4.6	230	910	
	268C2	99	31	64	4.2	210	105	
	268D2	95	30	60	4.0	200	444	1,709
Timula	271E2	68	22	41	2.8	140	115	
	271F2	N	N	37	2.6	130	281	
	271G2	N	N	N	N	N	950	1,346
Edgington	272	106	38	62	4.1	205	935	
	272+	106	38	62	4.1	205	78	1,013

TABLE 4 (cont.).

Soil series	Map symbol	Corn, bu.	Soybeans, bu.	Oats, bu.	Alfalfa hay, tons	Mixed pasture, days[c]	Mapping unit, acres	Soil series, acres
Seaton	274B	98	30	63	4.4	220	125	
	274C	96	30	61	4.3	215	1,720	
	274D	93	29	60	4.2	210	1,305	
	274D2	83	26	53	3.7	185	1,930	
	274D3	78	24	50	3.5	175	390	
	274E	89	28	57	4.0	200	420	
	274E2	79	24	50	3.6	180	1,285	
	274E3	74	23	47	3.3	165	1,285	
	274F	N	N	52	3.6	180	2,055	
	274F2	N	N	45	3.2	160	1,130	
	274F3	N	N	42	3.0	150	1,040	
	274G2	N	N	N	N	N	3,567	16,252
Joy	275A	140	44	84	5.5	275	114	
	275B	137	43	82	5.4	270	184	298
Port Byron	277A	121	40	78	5.1	255	75	
	277B	118	39	76	5.0	250	2,700	
	277C	116	39	75	4.9	245	1,865	
	277C2	105	34	68	4.4	220	340	
	277D	113	37	72	4.7	235	115	
	277D2	100	33	65	4.2	210	307	
	277D3	94	31	61	4.0	200	375	5,777
Rozetta	279A	114	36	66	4.6	230	40	
	279B	112	35	65	4.5	225	168	
	279C	110	34	63	4.4	220	65	273
Fayette	280B	110	34	65	4.5	225	3,215	
	280B2	104	32	61	4.3	215	100	
	280C	108	33	63	4.4	220	10,230	
	280C2	97	30	57	4.0	200	2,980	
	280D	104	32	61	4.3	215	2,690	
	280D2	93	29	55	3.8	195	8,980	
	280D3	87	27	51	3.6	180	2,735	
	280E	100	31	59	4.1	205	950	
	280E2	88	28	52	3.6	185	2,900	
	280E3	N	N	49	3.4	170	3,860	
	280F	N	N	53	3.5	180	2,845	
	280F2	N	N	47	3.3	165	2,105	
	280F3	N	N	44	3.0	150	1,250	
	280G	N	N	N	N	N	695	
	280G2	N	N	N	N	N	426	45,961
Chute	282E3	N	N	25	1.8	90	40	
	282F3	N	N	22	1.6	80	40	80
Wakeland	333	113	38	65	4.6	230	662	662
Downs	386A	124	39	75	5.1	255	70	
	386B	122	38	73	5.0	250	4,740	
	386C	119	37	72	4.9	245	2,840	
	386C2	108	34	65	4.4	220	2,177	
	386D	115	36	70	4.7	235	145	
	386D2	103	33	62	4.2	210	970	
	386E	110	35	67	4.5	225	60	
	386E2	98	31	60	4.0	200	50	11,052

TABLE 4 (cont.).

Soil series	Map symbol	Corn,	Soybeans,	Oats,	Alfalfa hay,	Mixed pasture,	Mapping unit,	Soil series,
		bu.	bu.	bu.	tons	days[c]	acres	acres
Ashdale	411B	95	34	63	4.2	210	75	
	411C2	84	30	56	3.7	190	341	
	411D2	81	29	53	3.6	180	245	
	411E3	N	N	47	3.2	160	80	741
Ogle	412C	104	35	69	4.2	210	925	
	412C2	94	31	63	3.8	190	1,391	
	412D2	90	30	60	3.7	185	390	
	412D3	84	28	56	3.4	170	200	
	412E2	85	28	57	3.5	175	40	2,946
Gale	413D2	60	20	34	2.5	120	358	
	413F2	N	N	29	2.1	105	85	443
Myrtle	414B	102	35	63	4.1	205	70	
	414C	100	35	61	4.0	205	110	
	414C2	90	31	56	3.7	185	484	
	414D2	86	30	53	3.5	175	205	869
Orion	415	113	37	63	4.2	210	3,233	3,233
Durand	416C	104	36	64	4.3	215	140	
	416C2	94	33	58	3.9	195	310	
	416D2	90	32	56	3.7	190	1,071	
	416D3	84	30	52	3.5	175	640	
	416E2	85	30	53	3.6	180	75	
	416E3	N	N	50	3.3	165	125	2,361
Flagg	419B	98	32	57	3.9	195	130	
	419C	96	32	56	3.8	190	340	
	419C2	87	29	50	3.5	175	420	
	419D	93	31	55	3.7	185	165	
	419D2	83	27	48	3.3	165	679	
	419D3	78	26	46	3.1	155	115	
	419E2	79	26	47	3.2	160	605	
	419E3	N	N	44	3.0	150	280	2,734
Lawson	451	130	42	73	5.1	255	14,259	
	$\overline{451}$	N	N	N	N	245	130	14,389
Mixed Alluvial Land	455	N	N	N	N	N	3,955	3,955
Sogn	504E2	N	N	25	1.6	80	878	
	504G2	N	N	N	N	N	1,835	2,713
Dunbarton	505D2	53	17	36	2.5	125	225	
	505D3	N	N	34	2.3	115	320	
	505E	N	N	38	2.6	130	145	
	505E2	N	N	34	2.4	120	615	
	505E3	N	N	32	2.2	110	725	
	505F	N	N	35	2.4	120	1,760	
	505F2	N	N	30	2.1	105	1,000	
	505F3	N	N	28	2.0	100	275	
	505G	N	N	N	N	N	725	
	505G2	N	N	N	N	N	80	
	505G3	N	N	N	N	N	30	5,900

TABLE 4 (cont.).

Soil series	Map symbol	Corn, bu.	Soybeans, bu.	Oats, bu.	Alfalfa hay, tons	Mixed pasture, days[c]	Mapping unit, acres	Soil series, acres
Hitt	506C2	77	30	50	3.4	170	210	
	506D2	74	29	47	3.2	160	346	
	506D3	70	26	45	3.0	150	205	
	506E2	71	27	46	3.1	155	70	
	506F2	N	N	41	2.8	140	30	861
Dunbarton, cherty variant	511E3	N	N	25	1.8	100	125	
	511F	N	N	28	1.9	110	90	
	511F3	N	N	22	1.5	90	93	
	511G2	N	N	N	N	N	70	378
Keltner	546C2	79	29	46	3.4	170	55	
	546D2	76	27	44	3.2	160	104	
	546E2	72	26	43	3.1	155	40	
	546E3	N	N	41	2.9	150	40	
	546F2	N	N	36	2.6	130	50	289
Port Byron, sandy substratum	562B	108	38	66	4.4	220	313	
	562C	106	37	64	4.3	215	210	
	562C2	96	34	58	3.9	195	55	
	562D	102	36	62	4.2	205	55	
	562D2	91	32	56	3.7	185	40	673
Seaton, sandy substratum	563B	91	29	56	3.8	190	145	
	563C	88	29	55	3.7	180	200	
	563C2	80	26	50	3.4	170	60	
	563D	86	28	53	3.6	175	75	
	563D2	76	25	47	3.2	160	187	
	563D3	72	23	44	3.0	150	50	
	563E3	68	22	42	2.9	145	95	812
Waukegan	564B	94	37	56	3.9	195	458	
	564C	92	37	55	3.8	190	870	
	564C2	84	33	50	3.5	175	455	
	564D2	80	31	47	3.3	165	750	
	564E2	76	30	45	3.2	160	85	2,618
Tell	565B	84	28	48	3.3	170	145	
	565C	83	28	47	3.3	165	265	
	565C2	75	25	43	3.0	150	466	
	565D	80	27	46	3.2	160	195	
	565D2	71	24	41	2.8	140	875	
	565D3	67	22	38	2.6	130	215	
	565E2	68	23	39	2.7	135	275	
	565E3	N	N	36	2.5	125	275	
	565F2	N	N	35	2.4	120	585	
	565F3	N	N	32	2.2	110	135	3,431
Niota, clayey subsurface variant	568A	64	23	43	2.6	130	330	
	568B	63	22	42	2.5	125	110	440
Loran	572C	91	33	53	3.8	190	70	
	572D	88	32	51	3.6	185	40	
	572D2	79	28	46	3.2	165	40	150

TABLE 4 (cont.).

Soil series	Map symbol	Corn, bu.	Soybeans, bu.	Oats, bu.	Alfalfa hay, tons	Mixed pasture, days[c]	Mapping unit, acres	Soil series, acres
Ogle, silt loam subsoil variant	574B	90	30	60	3.7	185	653	
	574C	88	29	59	3.6	180	290	943
Zwingle	576A	80	30	53	3.4	170	255	
	576B	78	29	52	3.3	165	255	
	576C	77	29	51	3.2	160	57	567
Terrace Escarpments	577D	N	N	40	2.6	135	120	
	577E	N	N	38	2.5	130	145	
	577F	N	N	35	2.3	115	497	762
Dorchester, cobbly subsoil variant	578	105	36	64	4.2	210	647	647
Coatsburg	660D2	60	20	38	2.6	130	40	
	660D3	N	N	36	2.4	115	98	
	660E2	N	N	36	2.4	120	30	
	660E3	N	N	34	2.3	110	65	233
Onarga, reddish subsoil variant	673B	88	31	58	3.6	180	282	282
Eleroy and Derinda	949C2	70	30	44	3.0	150	50	
	949D2	66	28	42	2.8	140	165	
	949D3	62	26	39	2.6	130	45	
	949E2	63	27	40	2.7	135	120	
	949E3	N	N	37	2.5	125	70	
	949F2	N	N	36	2.4	120	68	518
Dubuque and Palsgrove	950C	75	29	48	3.3	165	1,455	
	950C2	70	26	44	3.0	150	770	
	950D	74	28	46	3.2	160	110	
	950D2	66	25	42	2.8	140	1,920	
	950D3	N	N	39	2.6	130	230	
	950E	N	N	44	3.0	150	350	
	950E2	N	N	40	2.7	135	1,429	
	950E3	N	N	37	2.5	125	145	
	950F	N	N	40	2.8	140	2,190	
	950F2	N	N	36	2.4	120	120	
	950F3	N	N	33	2.2	110	55	
	950G	N	N	N	N	N	145	
	950G2	N	N	N	N	N	30	8,949
Palsgrove and Woodbine	951C or YC	80	32	48	3.4	170	175	
	951C2 or YC2	72	29	44	3.0	150	240	
	951D or YD	77	30	46	3.2	160	190	
	951D2 or YD2	69	27	42	2.8	140	1,995	
	951D3 or YD3	65	26	39	2.6	130	535	
	951E or YE	69	29	44	3.0	150	215	
	951E or YE2	66	26	40	2.7	135	535	
	951E3 or YE3	N	N	37	2.5	125	340	
	951F or YF	N	N	40	2.8	140	303	
	951F2 or YF2	N	N	36	2.4	120	225	
	951F3 or YF3	N	N	33	2.2	110	90	
	951G2 or YG2	N	N	N	N	N	65	
	951G3 or YG3	N	N	N	N	N	30	4,938

TABLE 4 (cont.).

Soil series	Map symbol	Corn, bu.	Soybeans, bu.	Oats, bu.	Alfalfa hay, tons	Mixed pasture, days[c]	Mapping unit, acres	Soil series acres
Tell and Lamont	952C or ZC	76	28	47	3.2	160	235	
	952C2 or ZC2	68	24	43	2.9	145	105	
	952D2 or ZD2	64	23	41	2.7	135	380	
	952D3 or ZD3	61	22	38	2.5	125	65	
	952E2 or ZE2	62	22	39	2.6	130	135	
	952E3 or ZE3	N	N	37	2.4	125	150	
	952F or ZF	N	N	36	2.6	130	207	
	952F2 or ZF2	N	N	35	2.5	120	415	
	952F4 or ZF4	N	N	26	2.2	105	50	1,742
Casco and Fox	972D2 or XD2	60	20	38	2.5	125	40	
	972E2 or XE2	N	N	35	2.3	115	51	
	972E3 or XE3	N	N	29	1.9	95	40	131
	Made land and borrow pits						316	316
	Gravel and sand pits						145	145
	Limestone quarries						95	95
	Savanna Ordnance Depot						1,600	1,600
	Water						13,696	13,696
	TOTAL						305,280	305,280

a High level of management is defined in the text.

b Mapping unit acres furnished mainly by Carroll County Tax Assessor's Office.

c Animal-unit-days, which express the carrying capacity of pasture. It is the number of days 1 acre can carry 1 animal unit during a single grazing season without injury to the sod. One animal unit equals 1 cow, 2 yearling calves, 1 horse, 5 sheep, or 4 brood sows.

d Symbol N indicates crop not adapted or not commonly grown.

Distribution of Soils by Slope Range and Degree of Erosion in Acres, Excluding 187 Acres of Blown-Out Land (63)

	A 0-2%	B 2-4%	C 4-7%	D 7-12%	E 12-18%	F 18-30%	G 30-60%	Total
None to slight	58,984	66,333	39,679	5,987	2,783	10,437	1,565	185,768
Moderate	0	240	25,909	28,968	10,602	8,048	7,354	81,121
Severe	0	0	215	9,088	9,076	3,713	210	22,302
Gullied	0	0	0	0	0	50	0	50
TOTAL	58,984	66,573	65,803	44,043	22,461	22,248	9,129	289,241

Equipment limitation refers to soil characteristics and topographic features that restrict the use of equipment in planting, tending, or harvesting trees. *Slight* means that there is little or no restriction on the type of equipment or time of year when it can be used. *Moderate* means that use of equipment is restricted because of steep slopes or because soils are wet for three months or less each year. *Severe* indicates that the very steep slopes make special harvesting methods necessary or that use of equipment is

restricted because the soils are wet for more than three months each year.

Seedling mortality refers to the expected loss of natural or planted tree seedlings as influenced by kinds of soil or topographic features. Losses caused by plant competition are excluded. It is assumed that the natural supply of seed is adequate, that the stock is good, that seedlings are properly planted and cared for, and that climatic conditions are normal. *Slight* means that losses normally are not more than 25 percent of the planted or natural stock; *moderate* indicates that losses are between 25 and 50 percent; and *severe* indicates that more than half of the planted or natural stock is likely to die.

Plant competition refers to the rate at which unwanted trees, shrubs, and weeds are likely to invade a given site where openings are made in the canopy. *Slight* means that competition is not a major problem. *Moderate* means that plant competition develops but does not prevent the establishment of desirable species and can be controlled easily. *Severe* indicates that stands of desired species are not restocked naturally and that planted trees may be choked out unless intensive management is applied to eliminate competing plants.

Windthrow hazard is an evaluation of soil characteristics that control tree root development and, therefore, affect tree wind firmness. All soils are rated slight, which indicates no special problems are recognized.

Table 5 lists, for each woodland suitability group, tree species to favor in natural stands. The ratings are based on the suitability of the species for the site and the market value of the trees. Species are not listed in order of preference. Species suitable for planting are given for each group. On those soils where aspect is a factor, adapted species are listed for northeast and south-west exposures. On soils where windbreaks are considered beneficial, some adapted tree and shrub species for this use are also listed.

General Management of Soils for Wildlife[1]

Wildlife in Carroll County can be classified into three major groups: openland, woodland, and wetland. Soils in the county have potential for habitat development for all three kinds of wildlife.

In Table 6 the soils are placed in seven groups and rated according to their suitability for elements of wildlife habitat and for kinds of wildlife. The ratings are good, fair, poor, and very poor. A rating of good means that habitats are easily established, improved, or maintained. A rating of fair indicates that the soils have moderate limitations for establishing and maintaining habitats. A poor rating means that the soils have severe limitations for establishing and maintaining habitats; habitat management may be difficult and expensive. A very poor rating means it is generally impractical to establish and maintain wildlife habitats on these soils.

The six elements of wildlife habitat and the three kinds of wildlife shown in Table 6 are defined in the following paragraphs.

Grain and seed crops. These are domestic grains or seed-producing annual plants, including such crops as corn, sorghum, wheat, oats, soybeans, buckwheat, and sunflowers.

Grasses and legumes. These are domestic perennial grasses and legumes, including such crops as brome, fescue, timothy, redtop, orchardgrass, reed canarygrass, clovers, trefoil, alfalfa, and sericea.

Wild herbaceous plants. These are native or introduced perennial grasses and forbs that provide food and cover principally for upland wildlife. These plants include bluestem, indiangrass, wheatgrasses, wild rye, oatgrasses, pokeweed, strawberries, lespedezas, tick clovers, wild beans, jewelweed, and ragweed.

Hardwood plants. These are nonconiferous trees, shrubs, and woody vines that produce fruits, nuts, buds, catkins, twigs (browse), or foliage used extensively as food by wildlife. These plants, commonly established by natural processes but also planted, include oak, cherry, hawthorn, dogwood, viburnum, hazel, maple, birch, ash, grapes, sumac, briers, greenbriers, and roses.

Wetland plants. These are annual and perennial wild herbaceous plants, excluding submerged or floating aquatic plants, that grow on moist or wet sites. These plants, used mainly by wetland wildlife for food and cover, include smartweeds, wild millets, rushes, sedges, reeds, rice cutgrass, mannagrass, bluejoint, cord grasses, cattails, pondweeds, wild celery, and spatterdocks.

Shallow water developments. These are impoundments or excavations, generally not more than five feet deep. Examples are low dikes and levees, shallow dugouts, level ditches, and devices for controlling the water level on marshy streams or channels.

Soils are not rated for impounded farm ponds in Table 6. However, this type of pond attracts migratory waterfowl and can be used for freshwater fish. Features affecting the use of soils for impounded farm ponds are given in Table 9, "Interpretations of Engineering Properties of Soils."

Openland wildlife. Included are the quail, mourning dove, meadowlark, cottontail rabbit, red fox, and other birds and mammals which normally live on cropland, pastures, hayland, and other areas overgrown with grasses, forbs, and shrubs. Wildlife habitat elements used to rate the soils for this kind of wildlife are grain and seed crops, grasses and legumes, wild herbaceous plants, and hardwood plants.

[1] This section was prepared primarily by Rex Hamilton, Biologist, Soil Conservation Service.

TABLE 5. — WOODLAND SUITABILITY GROUPS FOR CARROLL COUNTY SOILS

Woodland suitability groups	Potential productivity: Species	Potential productivity: Site index[a]	Potential productivity: Annual growth[b] (bd. ft. per acre)	Management limitations: Erosion hazard	Management limitations: Equipment limitation	Management limitations: Seedling mortality	Management limitations: Plant competition	Management limitations: Windthrow hazard	Species suitability[c]: To favor in existing stands	To plant: On cool sites--facing north and east: None to mod. erosion	To plant: On cool sites--facing north and east: Severe erosion	To plant: On hot sites--facing south and west: None to mod. erosion	To plant: On hot sites--facing south and west: Severe erosion	On windbreaks: Trees	On windbreaks: Shrubs
Group 1o1. Well-drained and moderately well-drained, nearly level to strongly sloping soils on uplands and terraces. They have silt loam or silty clay loam subsoil horizons. The soils are moderately permeable and have high to very high available water capacity.	Upland oaks[d] Yellow poplar	85+ 95+	350-450 550-650	Slight	Slight	Slight	Slight to moderate	Slight	Yellow poplar, white oak, red oak, green ash	White oak, black walnut, red oak, ash, white pine, red pine, sugar maple		Red pine, black walnut, ash		White pine, red pine, Norway spruce, white spruce, Douglas fir	Forsythia, silky dogwood, autumn olive, amur maple, gray dogwood, Russian olive, amur honeysuckle, spirea, American cranberry bush, lilac
Group 1o4. Well-drained and moderately well-drained, nearly level to gently sloping soils on bottomlands. They have silt loam surface horizons and silt loam or cobbly substrata. The soils are moderately permeable and have moderate to very high available water capacity.	Cottonwood Yellow poplar	105+ 95+	550-650 550-650	Slight	Slight	Slight	Moderate	Slight	Cottonwood, sycamore, yellow poplar, ash, swamp white oak, black walnut	Black walnut, sycamore, cottonwood, red maple, sugar maple, ash, hackberry				White pine, red pine, Norway spruce, white spruce, Douglas fir	Forsythia, amur maple, gray dogwood, silky dogwood, autumn olive, Russian olive, amur honeysuckle, spirea, American cranberry bush, lilac
Group 1r2. Well-drained and moderately well-drained, very strongly sloping to steep soils on uplands and terraces. They have silt loam surface horizons and silt loam or silty clay loam subsoil horizons. The soils are moderately permeable and have high to very high available water capacity.	Upland oaks[d] Yellow poplar	85- 95 95-105	350-450 550-650	Moderate	Moderate	Slight	Moderate	Slight	White oak, red oak, yellow poplar, ash	White oak, black walnut, red oak, ash, white pine, red pine, sugar maple	Red pine, scotch pine, black locust	Red pine, black walnut, ash	Red pine, scotch pine, red cedar, black locust	White pine, red pine, Norway spruce, white spruce, Douglas fir	Forsythia, silky dogwood, autumn olive, amur maple, gray dogwood, Russian olive, amur honeysuckle, spirea, American cranberry bush, lilac
Group 2o1. Well-drained to somewhat poorly drained, nearly level to strongly sloping soils on uplands and terraces. They have silt loam surface horizons and silt loam, silty clay loam, clay loam, or gravelly clay loam subsoil horizons. The soils are moderately permeable and have moderate to very high available water capacity.	Yellow poplar Upland oaks[d]	85-95 75-85	450-550 250-350	Slight	Slight	Slight	Slight to severe	Slight	White oak, red oak, yellow poplar, black walnut	White oak, black walnut, red oak, ash, white pine, red pine, sugar maple	Red pine, scotch pine, black locust	Red pine, black walnut, ash	Red pine, scotch pine, red cedar, black locust	White pine, red pine, Norway spruce, white spruce, Douglas fir	Forsythia, silky dogwood, autumn olive, amur maple, gray dogwood, Russian olive, amur honeysuckle, spirea, American cranberry bush, lilac

Group 1o1 units - 36A, 36B, 36B2, 36C, 36C2, 36C3, 36D, 36D2, 36D3,(Tama)[e]; 37A, 37B, 37C, 37D2, (Worthen)[e]; 75B, 75C, 75C2, 75D2, (Drury); 134A, 134B, 134C, 134C2, 134D2, (Camden); 277A, 277B, 277C, 277C2, 277D, 277D2, 277D3, (Port Byron)[e]; 574B, 574C, (Ogle, silt loam subsoil variant)[e].

Group 1o4 units - 77, (Huntsville)[e]; 239A, 239B, (Dorchester); 578, (Dorchester, cobbly subsoil variant).

Group 1r2 units - 36E2, 36E3, (Tama)[e]; 75E2, 75F2, (Drury); 134E2, (Camden).

Group 2o1 units - 21B, 21C, 21C2, 21C3, 21D, 21D2, 21D3, (Pecatonica); 30D2, (Hamburg); 41A, 41B, (Muscatine)[e]; 81A, 81B, 81C, (Littleton)[e]; 224C2, 224D2, (Strawn); 227B, 227C, 227C2, 227D2, (Argyle); 268B, 268C, 268C2, 268D2, (Mt. Carroll); 274B, 274C, 274D, 274D2, 274D3, (Seaton); 275A, 275B, (Joy)[e]; 279A, 279B, 279C, (Rozetta); 280B, 280B2, 280C, 280C2, 280D, 280D2, 280D3, (Fayette); 386A, 386B, 386C, 386C2, 386D, 386D2, (Downs); 412C, 412C2, 412D2, 412D3, (Ogle)[e]; 414B, 414C, 414C2, 414D2, (Myrtle); 416C, 416C2, 416D3, (Durand)[e]; 419B, 419C, 419C2, 419D, 419D2, 419D3, (Flagg); 562B, 562C, 562C2, 562D, 562D2, (Port Byron, sandy substratum)[e]; 563B, 563C, 563C2, 563D, 563D2, 563D3, (Seaton, sandy substratum).

[a]Determined according to method described in the narrative accompanying this table.

[b]Doyle Rule (20).

[c]Absence of suggested species indicates column not applicable to the particular woodland suitability group; for those groups that are nearly level, and where slope aspect is not a factor, species suitable for planting are listed in the column for "Cool sites, none to mod. erosion."

[d]Upland oaks include white oak, black oak, red oak, and bur oak.

[e]No natural woodland on these soils, but they are adapted to species listed as suitable for planting.

TABLE 5 (cont.).

Woodland suitability groups	Potential productivity: Species	Site index[a]	Annual growth[b] (bd. ft. per acre)	Management limitations: Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Windthrow hazard	Species suitability[c]: To favor in existing stands	To plant: On cool sites--facing north and east: None to mod. erosion	On cool sites--facing north and east: Severe erosion	On hot sites--facing south and west: None to mod. erosion	On hot sites--facing south and west: Severe erosion	On windbreaks: Trees	On windbreaks: Shrubs
Group 2o4. Somewhat poorly drained, nearly level soils on bottomlands. They have predominantly silt loam surface horizons and silt loam substrata. The soils are moderately permeable and have high to very high available water capacity.	Cottonwood Yellow poplar Pin oak	95-105 85-95 85-95	450-550 450-550 350-450	Slight	Slight	Slight	Severe	Slight	Cottonwood, sycamore, yellow poplar, pin oak	Cottonwood, pin oak, sycamore, red maple, swamp white oak, ash				White pine, red pine, Norway spruce, white spruce, Douglas fir, arborvitae	Silky dogwood, amur maple, American cranberry bush, forsythia
Group 2r2. Most of the soils are well-drained or moderately well-drained and occur on very strongly sloping to steep upland and terrace areas. Hamburg soils are somewhat excessively drained and some Terrace Escarpments are strongly sloping. They have silt loam or silty clay loam surface horizons and either silt loam, silty clay loam, clay loam, or gravelly clay loam subsoil horizons. The soils are primarily moderately permeable and have moderate to very high available water capacity.	Yellow poplar Upland oaks[d]	85-95 75-85	450-550 250-350	Moderate	Moderate	Slight to moderate	Moderate	Slight	White oak, red oak, black locust	White oak, black walnut, red oak, ash, white pine, red pine, sugar maple	Red pine, scotch pine, black locust	Red pine, black walnut, ash	Red pine, scotch pine, red cedar, black locust	White pine, red pine, Norway spruce, white spruce, Douglas fir	Forsythia, silky dogwood, autumn olive, amur maple, gray dogwood, Russian olive, amur honeysuckle, spirea, American cranberry bush, lilac
Group 2w3. Poorly drained, nearly level soils on uplands and terraces. They have silty clay loam or loam surface horizons and silty clay loam or clay loam subsoil horizons. The soils are moderately permeable and have high to very high available water capacity.										Cottonwood, pin oak, sycamore, red maple, swamp white oak, ash				Arborvitae	Silky dogwood, amur maple, American cranberry bush, forsythia
Group 2w5. Very poorly to somewhat poorly drained, nearly level soils on bottomlands and low terraces. The surface horizons and substrata are silt loam, silty clay loam, loam, sandy loam, or muck. The soils have moderate to moderately rapid permeability and moderate to very high available water capacity. Most of the soils are subject to flooding.	Pin oak Cottonwood	85-95 95-105	350-450 450-550	Slight	Moderate	Moderate	Severe	Slight	Pin oak, cottonwood, sycamore	Cottonwood, pin oak, sycamore, red maple, swamp white oak, ash				Arborvitae	Silky dogwood, amur maple, American cranberry bush, forsythia

Group 2o4 units - 333, (Wakeland); 415, (Orion); 451, (Lawson)[e]; 455, (Mixed Alluvial Land).

Group 2r2 units - 19E3, 19F2, 19F3, (Sylvan); 21E, 21E2, 21E3, 21F, 21F2, 21F3, (Pecatonica); 30F2, (Hamburg); 224E2, 224E3, 224F2, 224F3, (Strawn); 227E2, (Argyle); 274E, 274E2, 274E3, 274F, 274F2, 274F3, (Seaton); 280E, 280E2, 280E3, 280F, 280F2, 280F3, (Fayette); 386E, 386E2, (Downs); 412E2, (Ogle)[e]; 416E2, 416E3, (Durand)[e]; 419E2, 419E3, (Flagg); 563E3, (Seaton, sandy substratum); 577D, 577E, 577F, (Terrace Escarpments).

Group 2w3 units - 68, 68+, (Sable)[e]; 125, (Selma)[e]; 152, (Drummer)[e].

Group 2w5 units - 76, $\overline{76}$, (Otter)[e]; 82, $\overline{82}$ (Millington)[e]; 100, $\overline{100}$, (Palms)[e]; 107, $\overline{107}$, 107+, (Sawmill)[e]; 201, (Gilford)[e]; 210, $\overline{210}$, (Lena)[e]; $\overline{237}$, (Hoopeston)[e]; $\overline{239A}$, (Dorchester)[e]; $\overline{451}$, (Lawson)[e].

[a] Determined according to method described in the narrative accompanying this table.

[b] Doyle Rule (20).

[c] Absence of suggested species indicates column not applicable to the particular woodland suitability group; for those groups that are nearly level, and where slope aspect is not a factor, species suitable for planting are listed in the column for "Cool sites, none to mod. erosion."

[d] Upland oaks include white oak, black oak, red oak, and bur oak.

[e] No natural woodland on these soils, but they are adapted to species listed as suitable for planting.

TABLE 5 (cont.).

Woodland suitability groups	Potential productivity: Species	Site index[a]	Annual growth[b] (bd. ft. per acre)	Management limitations: Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Windthrow hazard	Species suitability[c]: To favor in existing stands	To plant: On cool sites--facing north and east: None to mod. erosion	Severe erosion	On hot sites--facing south and west: None to mod. erosion	Severe erosion	On windbreaks: Trees	Shrubs
Group 3o1. Somewhat poorly drained to well-drained, nearly level to strongly sloping soils on uplands and terraces. They have silt loam, loam, or sandy loam surface horizons and silty clay loam, clay loam, sandy loam, or clay subsoil horizons. The soils are slowly to moderately rapidly permeable and have low to very high available water capacity.	Upland oaks[d]	65-75	150-250	Slight	Slight	Slight	Slight	Slight	White oak, red oak, ash, bur oak	White pine, scotch pine, red cedar, red pine	White pine, scotch pine, red cedar, black locust, red pine	White pine, red pine	Scotch pine, black locust, jack pine, red pine, red cedar, osage orange	White pine, Norway spruce, Douglas fir, red pine, arborvitae, white spruce	Silky dogwood, gray dogwood, autumn olive, amur maple, Russian olive, spirea
Group 3r2. Most of the soils are moderately well or well drained, are very strongly sloping to steep, and occur on uplands. Coatsburg soils are poorly drained. Some Coatsburg soils are strongly sloping. The soils have silt loam surface horizons and silt loam, silty clay loam, clay loam, or clay subsoil horizons. The soils are very slowly to moderately permeable and have low to high available water capacity.	Upland oaks[d]	65-75	150-250	Moderate	Moderate	Moderate	Slight	Slight	White oak, red oak, white ash, bur oak	White pine, scotch pine, red cedar, red pine	White pine, scotch pine, red cedar, black locust, red pine	White pine, red pine	Scotch pine, black locust, jack pine, red pine, red cedar, osage orange	White pine, Norway spruce, Douglas fir, red pine, arborvitae, white spruce	Silky dogwood, gray dogwood, autumn olive, amur maple, Russian olive, spirea
Group 3r3. Well-drained to somewhat excessively drained, very steep soils on uplands. They have silt loam surface horizons and silt loam, silty clay loam, or clay subsoil horizons. The soils are slowly to moderately permeable and have low to very high available water capacity.	Upland oaks[d]	65-75	150-250	Severe	Severe	Severe	Slight	Slight	Red oak, white oak, bur oak, white ash	Red cedar, white pine, red pine, scotch pine	White pine, scotch pine, red cedar, black locust, red pine	White pine, red pine	Scotch pine, black locust, jack pine, red pine, red cedar, osage orange	White pine, red pine, Norway spruce, Douglas fir, arborvitae, white spruce	Russian olive, autumn olive, silky dogwood, gray dogwood, amur maple, spirea
Group 3s2. Well-drained to somewhat excessively drained, nearly level to strongly sloping soils on uplands and terraces. They have fine sand, fine sandy loam, sandy loam, loam, or silt loam surface horizons and fine sand, fine sandy loam, loam, silt loam, sandy	Upland oaks[d]	65-75	150-250	Slight to moderate	Slight to severe	Moderate to severe	Slight to severe	Slight	Black oak, white oak	White pine, scotch pine, red cedar, red pine	White pine, scotch pine, red cedar, black locust, red pine	White pine, red pine	Scotch pine, black locust, jack pine, red pine, red cedar,	White pine, Norway spruce, Douglas fir, red pine, arborvitae, white spruce	Silky dogwood, gray dogwood, autumn olive, amur maple, Russian olive, spirea

Group 3o1 units - 61A, 61B, (Atterberry); 172, 237, 237+, (Hoopeston)[e]; 411B, 411C2, 411D2, (Ashdale)[e]; 413D2, (Gale); 505D2, 505D3, (Dunbarton); 506C2, 506D2, 506D3, (Hitt)[e]; 546C2, 546D2, (Keltner)[e]; 572C, 572D, 572D2, (Loran)[e]; 949C2, 949D2, 949D3, (Eleroy and Derinda); 950C, 950C2, 950D, 950D2, 950D3, (Dubuque and Palsgrove); 951C, 951C2, 951D, 951D2, 951D3, (Palsgrove and Woodbine).

Group 3r2 units - 271E2, 271F2, (Timula); 411E3, (Ashdale)[e]; 413F2, (Gale); 505E, 505E2, 505E3, 505F, 505F2, 505F3, (Dunbarton); 506E2, 506F2, (Hitt)[e]; 511E3, 511F, 511F3, (Dunbarton, cherty variant); 546E2, 546E3, 546F2, (Keltner)[e]; 660D2, 660D3, 660E2, 660E3, (Coatsburg)[e]; 949E2, 949E3, 949F2, (Eleroy and Derinda); 950E, 950E2, 950E3, 950F, 950F2, 950F3, (Dubuque and Palsgrove); 951E, 951E2, 951E3, 951F, 951F2, 951F3, (Palsgrove and Woodbine).

Group 3r3 units - 19G2, 19G3, (Sylvan); 30G2, (Hamburg); 271G2, (Timula); 274G2, (Seaton); 280G, 280G2, (Fayette); 504G2, (Sogn); 505G, 505G2, 505G3, (Dunbarton); 511G2, (Dunbarton, cherty variant); 950G, 950G2, (Dubuque and Palsgrove); 951G2, 951G3, (Palsgrove and Woodbine).

[a] Determined according to method described in the narrative accompanying this table.

[b] Doyle Rule (20).

[c] Absence of suggested species indicates column not applicable to the particular woodland suitability group; for those groups that are nearly level, and where slope aspect is not a factor, species suitable for planting are listed in the column for "Cool sites, none to mod. erosion."

[d] Upland oaks include white oak, black oak, red oak, and bur oak.

[e] No natural woodland on these soils, but they are adapted to species listed as suitable for planting.

TABLE 5 (cont.).

Woodland suitability groups	Potential productivity: Species	Site index[a]	Annual growth[b] (bd. ft. per acre)	Management limitations: Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Windthrow hazard	Species suitability[c]: To favor in existing stands	To plant: On cool sites--facing north and east: None to mod. erosion	Severe erosion	On hot sites--facing south and west: None to mod. erosion	Severe erosion	On windbreaks: Trees	Shrubs
Group 3s2 (continued) clay loam, or clay loam subsoil horizons. They are moderately to rapidly permeable and have low to moderate available water capacity. Soil blowing is a hazard.									Group 3s2 (continued)				osage orange		
Group 3s3. Well-drained to excessively drained, very strongly sloping to steep soils on uplands and terraces. They have gravelly loam, fine sand, fine sandy loam, sandy loam, or silt loam surface horizons and gravel, sand, fine sand, fine sandy loam, loam, silt loam, or clay loam subsoil horizons or substrata. They are moderately to very rapidly permeable and have very low to moderate available water capacity. Soil blowing is a hazard.	Upland oaks[d]	65-75	150-250	Moderate	Moderate to severe	Severe	Slight	Slight	Black oak, white oak	White pine, scotch pine, red cedar, red pine	White pine, scotch pine, red cedar, black locust, red pine	White pine, red pine	Scotch pine, black locust, jack pine, red pine, red cedar, osage orange	White pine, Norway spruce, Douglas fir, red pine, arborvitae, white spruce	Silky dogwood, gray dogwood, autumn olive, amur maple, Russian olive, spirea
Group 3w2. Poorly drained, nearly level to moderately sloping soils on uplands and terraces. They have silt loam or silty clay loam surface horizons and silty clay loam, silty clay, or clay subsoil horizons. The soils are moderately slowly to very slowly permeable and have moderate to high available water capacity.	Pin oak	75-85	200-300	Slight	Moderate	Moderate	Severe	Slight	White oak, pin oak, ash, yellow poplar	Pin oak, ash, red maple,				Arborvitae	Forsythia, gray dogwood, amur maple, American cranberry bush
Group 4s2. Excessively to somewhat excessively drained, nearly level to steep soils on uplands and terraces. They have sand, loamy sand, loamy fine sand, or fine sand surface horizons and substrata. The soils are rapidly to very rapidly permeable and have very low to low available water capacity. Soil blowing is a hazard.	Upland oaks[d]	55-65	100-150	Slight	Moderate	Moderate	Slight	Slight	Black oak, white oak	White pine, scotch pine, red cedar, red pine	White pine, scotch pine, red cedar, black locust, red pine	White pine, red pine	Scotch pine, black locust, jack pine, red pine, red cedar, osage orange	White pine, Norway spruce, Douglas fir, red pine, arborvitae, white spruce	Silky dogwood, gray dogwood, autumn olive, amur maple, Russian olive, spirea

Group 3s2 units - 53B, 53D, (Bloomfield); 87A, 87B, 87C, 87C2, (Dickinson)[e]; 175B, 175C, 175C2, 175D, 175D2, 175D3, (Lamont); 564B, 564C, 564C2, 564D2, (Waukegan)[e]; 565B, 565C, 565C2, 565D, 565D2, 565D3, (Tell); 673B, (Onarga, reddish subsoil variant)[e]; 952C, 952C2, 952D2, 952D3, (Tell-Lamont complex); 972D2 (Casco-Fox complex).

Group 3s3 units - 53F, (Bloomfield); 87E2, (Dickinson)[e]; 93E2, (Rodman); 175E2, 175E3, 175F2, 175F3, (Lamont); 504E2, (Sogn); 564E2, (Waukegan)[e]; 565E2, 565E3, 565F2, 565F3, (Tell); 952E2, 952E3, 952F, 952F2, 952F4, (Tell-Lamont complex); 972E2, 972E3, (Casco-Fox complex).

Group 3w2 units - 261, (Niota); 272, 272+ (Edgington)[e]; 568A, 568B, (Niota, clayey subsurface variant); 576A, 576B, 576C, (Zwingle).

Group 4s2 units - 54B, 54C3, 54F2, (Plainfield); 63, (Blown-Out Land); 88A, 88B, 88C, 88C2, 88D, 88E, (Sparta)[e]; 98A, 98B, 98C, 98D, (Ade)[e]; 282E3, 282F3, (Chute).

[a]Determined according to method described in the narrative accompanying this table.

[b]Doyle Rule (20).

[c]Absence of suggested species indicates column not applicable to the particular woodland suitability group; for those groups that are nearly level, and where slope aspect is not a factor, species suitable for planting are listed in the column for "Cool sites, none to mod. erosion."

[d]Upland oaks include white oak, black oak, red oak, and bur oak.

[e]No natural woodland on these soils, but they are adapted to species listed as suitable for planting.

Woodland wildlife. Included are the squirrel, white-tailed deer, raccoon, chipmunk, woodpecker, nuthatch, and other birds and mammals which frequent wooded areas consisting of hardwood trees and shrubs. Wildlife habitat elements used to rate the soils for this kind of wildlife are grasses and legumes, wild herbaceous plants, and hardwood plants.

Wetland wildlife. Included are various kinds of waterfowl, muskrat, mink, kingfisher, red-winged blackbird, and other birds and mammals which normally live in wet areas such as ponds, marshes, and swamps. Wildlife habitat elements used to rate the soils for this kind of wildlife are wetland plants and shallow water developments.

Recreational Uses of the Soils

In Table 7 the soils of Carroll County are placed in eight recreation groups and are rated according to their limitations for recreational uses. The ratings for the soils in each group are based on soil characteristics that affect use, such as natural drainage, seasonal high water table, flooding hazard, permeability, slope, texture of the surface layer, and stoniness or rockiness of the soils.

The ratings are *slight, moderate,* or *severe.* A rating of slight means that the soil has few or no limitations for the use specified or that the limitations can be easily overcome. A rating of moderate indicates that the limitations can be overcome by careful planning and maintenance. A rating of severe indicates that the soil is poorly suited to the use specified or that the limitations can be overcome only by intensive engineering practices requiring a large investment. The soil properties that determine moderate and severe limitations are mentioned with the ratings in Table 7. The recreational uses given in the table are discussed in the following paragraphs.

Cottages and utility buildings. These buildings include cottages, washrooms and bathrooms, picnic shelters, and service buildings that are used seasonally or all year. The ratings are based mainly on soil features that contribute to the adequate support of these buildings. Additional information on soil limitations for septic tank filter fields is given in Table 9 in the section, "Engineering Properties and Uses of the Soils."

Campsites. These are areas suitable for tents and trailers and for living outdoors for a period of one week or more. Little site preparation should be required. The soils are rated according to their limitations for unsurfaced parking areas for cars and camp trailers and for heavy traffic by people, horses, and small vehicles such as bicycles.

Picnic areas. Soils used for picnic areas need to support intensive foot traffic. Features that affect the desirability of a site, such as trees or ponds, are not considered in the ratings.

Playgrounds. These areas are developed for intensive play and for organized games such as baseball, football, and tennis. They are subject to intensive foot traffic.

Paths and trails. Soils used for paths and trails need to support intensive traffic of people on foot or on horseback. Little preparation should be needed. Paths and trails on sloping soils should be contoured to control erosion.

Golf fairways. The soils are rated only according to their limitations for fairways. Greens, traps, and hazards generally are made from transported soil material. Soils used for fairways should support intensive traffic of people on foot or driving golf carts. In addition, turf and various kinds of trees and shrubs should grow well on these soils.

Engineering Properties and Uses of the Soils

This section gives soil characteristics and interpretations that are likely to influence engineering practices. It is provided to help engineers use the soil survey information in this report.

Information in this section can be used as follows:

1. To make soil and land use studies that will aid in selecting and developing industrial, business, residential, and recreational sites.
2. To make preliminary estimates of the engineering properties of soils that are significant in planning flood prevention, agricultural drainage systems, farm ponds, irrigation systems, diversions, terraces, and waterways.
3. To make preliminary evaluations of soils and sites that will aid in selecting locations for highways, airports, pipelines, cables, low buildings, and sewage disposal systems.
4. To locate probable sources of gravel, sand, and limestone to be used for construction materials.
5. To correlate performance of engineering structures with soils and thus gain information that will be useful in designing and maintaining the structures.
6. To determine the suitability of soil units for cross-country movement of vehicles and construction equipment.
7. To supplement information obtained from other published maps and reports and aerial photographs for the purpose of making maps and reports that can be used readily by engineers.

The engineering interpretations are generalized and should be used primarily in planning more detailed field investigations to determine the characteristics of the soil material in place at the site of the proposed engineering work.

Some terms used by the agricultural soil scientist may be unfamiliar to the engineer, and some terms may have a special meaning in soil science. These terms are defined in the Glossary.

TABLE 6. — SUITABILITY OF CARROLL COUNTY SOILS FOR WILDLIFE

Wildlife groups	Elements of wildlife habitat						Kinds of wildlife		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood plants	Wetland plants	Shallow water developments	Openland wildlife	Woodland wildlife	Wetland wildlife
Group 1. Well-drained and moderately well-drained, nearly level to strongly sloping soils on uplands and terraces.	Good on 0 to 7 percent slopes; fair on 7 to 12 percent slopes; poor on 7 to 12 percent slopes that are severely eroded.	Good on all slopes, except fair on those that are severely eroded.	Good	Good	Very poor: no suitable plant species for food and cover.	Very poor: water table too deep.	Good on all slopes, except fair on those that are severely eroded.	Good on all slopes, except fair on those that are severely eroded.	Very poor: no suitable wetland food and cover plants; water supply limited.
Group 2. Well-drained and moderately well-drained, very strongly sloping soils on uplands and terraces.	Poor: slope severely limits use; very poor on severely eroded slopes.	Fair: slope moderately limits use; poor on severely eroded slopes.	Good	Good	Very poor: no suitable plant species for food and cover.	Very poor: too sloping and water table too deep.	Fair: production of grain and seed crops severely limited. Poor on severely eroded slopes.	Good: production of grasses and legumes moderately limited.	Very poor: no suitable wetland food and cover plants; water supply limited.
Group 3. Well and moderately well drained, steep and very steep soils on uplands and terraces.	Very poor: slope very severely limits use.	Fair on 18 to 30 percent slopes; very poor on slopes exceeding 30 percent.	Good	Good	Very poor: no suitable plant species for food and cover.	Very poor: too sloping and water table too deep.	Poor: unsuited for production of grain and seed crops.	Fair: production of grasses and legumes moderately limited.	Very poor: no suitable wetland food and cover plants; water supply limited.
Group 4. Somewhat poorly drained, nearly level to strongly sloping soils on uplands and terraces.	Good on drained areas; fair on undrained areas; wetness is a hazard.	Good on drained areas; fair on undrained areas; wetness is a hazard.	Good	Good	Fair: limited number of suitable species for food and cover.	Fair: water table not high enough to maintain water level all year; poor on soils with 2 to 4 percent slopes, very poor on soils with more than 4 percent slopes.	Good	Good	Fair: water supply and number of suitable wetland food and cover plants moderately limited.
Group 5. Somewhat poorly drained, nearly level and gently sloping soils on bottomlands.	Fair on most soils, wetness and flooding are hazards; good on the Dorchester (239) and Huntsville (77) soils and all drained areas.	Fair on most soils, wetness and flooding are hazards; good on the Dorchester (239) and Huntsville (77) soils and all drained areas.	Good	Good	Fair on most soils, limited number of suitable species for food and cover; poor on the Dorchester (239) and Huntsville (77) soils.	Fair on most soils; water table not high enough to maintain water level all year; poor on Dorchester (239) and Huntsville (77) soils.	Good on most soils, production of grain and seed crops moderately limited in undrained areas.	Good in drained areas; fair on the undrained areas; growth of grasses and legumes moderately limited.	Fair on most soils, water supply and number of suitable wetland food and cover plants moderately limited; poor on Dorchester (239) and Huntsville (77) soils.
Group 6. Poorly drained to very poorly drained, nearly level to very strongly sloping soils on uplands, terraces, and bottomlands.	Good on drained areas; fair on undrained soil and soils on slopes greater than 12 percent; wetness hazard, flooding or ponding limits growth; very poor on all wet soils.	Good on drained areas; fair on soils with 12 to 18 percent slopes; fair on undrained soil; wetness hazard, flooding or ponding limits growth.	Good on drained areas; fair on undrained soil; wetness hazard, flooding or ponding limits growth; poor on all wet soils.	Good on drained areas; fair on undrained soil; poor on all wet soils; bottomland soils subject to flooding.	Poor on drained areas; number of suitable species limited; good on undrained areas.	Fair on drained areas; water supply limited; good on undrained areas; poor on soils with 2 to 4 percent slopes; very poor on soils with greater than 4 percent slopes; bottomland soils are subject to flooding.	Good on drained areas; fair on undrained areas; grain and seed crops somewhat limited.	Good on drained areas; fair on undrained areas; growth of food and cover plants is limited.	Poor on drained areas; number of suitable wetland food and cover plants severely limited; good on undrained areas.
Group 7. Well to excessively drained, nearly level to very steep soils on uplands and terraces.	Very poor on most soils; slope or low available water capacity limits use.	Poor on most soils; slope or low available water capacity limits use.	Fair: low available water capacity or shallow depth to bedrock limits use on most soils.	Fair: low available water capacity or shallow depth to bedrock limits use on most soils.	Very poor: low available water and no suitable plant species.	Very poor: too sloping or water table too deep.	Poor on most soils; low available water severely limits growth of food and cover plants.	Poor on most soils; low available water severely limits growth of food and cover plants.	Poor: no suitable wetland food and cover plants; water supply limited.

(Table 6 groups listed on next page.)

TABLE 6. — WILDLIFE GROUPS:

Group 1 units - 21B, 21C, 21C2, 21C3, 21D, 21D2, 21D3, (Pecatonica); 36A, 36B, 36B2, 36C, 36C2, 36C3, 36D, 36D2, 36D3, (Tama); 37A, 37B, 37C, 37D2, (Worthen); 75B, 75C, 75C2, 75D2, (Drury); 134A, 134B, 134C, 134C2, 134D2, (Camden); 224C2, 224D2, (Strawn); 227B, 227C, 227C2, 227D2, (Argyle); 268B, 268C, 268C2, 268D2, (Mt. Carroll); 274B, 274C, 274D, 274D2, 274D3, (Seaton); 277A, 277B, 277C, 277C2, 277D, 277D2, 277D3, (Port Byron); 279A, 279B, 279C, (Rozetta); 280B, 280B2, 280C, 280C2, 280D, 280D2, 280D3, (Fayette); 386A, 386B, 386C, 386C2, 386D, 386D2, (Downs); 411B, 411C2, 411D2, (Ashdale); 412C, 412C2, 412D2, 412D3, (Ogle); 414B, 414C, 414C2, 414D2, (Myrtle); 416C, 416C2, 416D2, 416D3, (Durand); 419B, 419C, 419C2, 419D, 419D2, 419D3, (Flagg); 506C2, 506D2, 506D3, (Hitt); 546C2, 546D2, (Keltner); 562B, 562C, 562C2, 562D, 562D2, (Port Byron, sandy substratum); 563B, 563C, 563C2, 563D, 563D2, 563D3, (Seaton, sandy substratum); 574B, 574C, (Ogle, silt loam subsoil variant); 673B, (Onarga, reddish subsoil variant), 949C2, 949D2, 949D3, (Eleroy and Derinda); 951C, 951C2, 951D, 951D2, 951D3, (Palsgrove and Woodbine).

Group 2 units - 19E3, (Sylvan); 21E, 21E2, 21E3, (Pecatonica); 36E2, 36E3, (Tama); 75E2, (Drury); 134E2, (Camden); 224E2, 224E3, (Strawn); 227E2, (Argyle); 271E2, (Timula); 274E, 274E2, 274E3, (Seaton); 280E, 280E2, 280E3, (Fayette); 386E, 386E2, (Downs); 411E3, (Ashdale); 412E2, (Ogle); 416E2, 416E3, (Durand); 419E2, 419E3, (Flagg); 506E2, (Hitt); 546E2, 546E3, (Keltner); 563E3, (Seaton, sandy substratum); 577D, 577E, (Terrace Escarpments); 949E2, 949E3, (Eleroy and Derinda); 951E, 951E2, 951E3, (Palsgrove and Woodbine).

Group 3 units - 19F2, 19F3, 19G2, 19G3, (Sylvan); 21F, 21F2, 21F3, (Pecatonica); 75F2, (Drury); 224F2, 224F3, (Strawn); 271F2, 271G2, (Timula); 274F, 274F2, 274F3, 274G2, (Seaton); 280F, 280F2, 280F3, 280G, 280G2, (Fayette); 506F2, (Hitt); 546F2, (Keltner); 577F, (Terrace Escarpments); 949F2, (Eleroy and Derinda); 951F, 951F2, 951F3, 951G2, 951G3, (Palsgrove and Woodbine).

Group 4 units - 41A, 41B, (Muscatine); 61A, 61B, (Atterberry); 81A, 81B, 81C, (Littleton); 172, 237, 237+, (Hoopeston); 275A, 275B, (Joy); 572C, 572D, 572D2, (Loran).

Group 5 units - 77, (Huntsville); 239A, 239B, (Dorchester); 333, (Wakeland); 415, (Orion); 451, (Lawson); 455, (Mixed Alluvial Land); 578, (Dorchester, cobbly subsoil variant).

Group 6 units - 68, 68+, (Sable); 76, $\overline{76}$, (Otter); 82, $\overline{82}$, (Millington); 100, $\overline{100}$, (Palms); 107, $\overline{107}$, 107+, (Sawmill); 125, (Selma); 152, (Drummer); 201, (Gilford); 210, $\overline{210}$, (Lena); $\overline{237}$, (Hoopeston); $\overline{239A}$, Dorchester; 261, (Niota); 272, 272+, (Edgington); $\overline{451}$, (Lawson); 568A, 568B, (Niota, clayey subsurface variant); 576A, 576B, 576C, (Zwingle); 660D2, 660D3, 660E2, 660E3, (Coatsburg).

Group 7 units - 30D2, 30F2, 30G2, (Hamburg); 53B, 53D, 53F, (Bloomfield); 54B, 54C3, 54F2, (Plainfield); 63, (Blown-Out Land); 87A, 87B, 87C, 87C2, 87E2, (Dickinson); 88A, 88B, 88C, 88C2, 88D, 88E, (Sparta); 93E2, (Rodman); 98A, 98B, 98C, 98D, (Ade); 175B, 175C, 175C2, 175D, 175D2, 175D3, 175E2, 175E3, 175F2, 175F3, (Lamont); 282E3, 282F3, (Chute); 413D2, 413F2, (Gale); 504E2, 504G2, (Sogn); 505D2, 505D3, 505E, 505E2, 505E3, 505F, 505F2, 505F3, 505G, 505G2, 505G3, (Dunbarton); 511E3, 511F, 511F3, 511G2, (Dunbarton, cherty variant); 564B, 564C, 564C2, 564D2, 564E2, (Waukegan); 565B, 565C, 565C2, 565D, 565D2, 565D3, 565E2, 565E3, 565F2, 565F3, (Tell); 950C, 950C2, 950D, 950D2, 950D3, 950E, 950E2, 950E3, 950F, 950F2, 950F3, 950G, 950G2, (Dubuque and Palsgrove); 952C, 952C2, 952D2, 952D3, 952E2, 952E3, 952F, 952F2, 952F4, (Tell-Lamont complex); 972D2, 972E2, 972E3, (Casco-Fox complex).

TABLE 7. — RECREATIONAL USES OF SOILS

Recreation group	Degree of limitations and soil features affecting use for					
	Cottages and utility buildings	Campsites	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Group 1. Well-drained and moderately well-drained, nearly level to moderately sloping soils on uplands and terraces.	Slight	Slight	Slight	Slight for 0 to 2 percent slopes; moderate for 2 to 7 percent slopes; moderate limitations for grading and leveling.	Slight	Slight
Group 2. Excessively and somewhat excessively drained, nearly level and gently sloping soils on uplands and terraces.	Slight for Dickinson and Lamont soils; moderate for Ade, Bloomfield, Plainfield and Sparta soils; severe for Blown-Out Land because of high susceptibility to blowing. All of these soils are drouthy.	Slight for Dickinson and Lamont soils; moderate to severe for Ade, Bloomfield, Blown-Out Land, Plainfield, and Sparta soils. Sandy surface texture, drouthiness, blowing, and low inherent fertility limit use; difficult to maintain vegetation.	Slight for Dickinson and Lamont soils, drouthiness limits use; moderate to severe for Ade, Bloomfield, Blown-Out Land, Plainfield, and Sparta soils. Blowing, sandy surface texture, drouthiness, and inherent low fertility limit use.	Moderate for Dickinson and Lamont soils, drouthiness limits use; severe for Ade, Bloomfield, Blown-Out Land, Plainfield and Sparta soils. Surface texture, blowing, drouthiness, and inherent low fertility limit use; difficult to maintain vegetation.	Slight for Dickinson and Lamont soils; moderate to severe for Ade, Bloomfield, Blown-Out Land, Plainfield, and Sparta soils. Surface texture, drouthiness, blowing, and inherent low fertility limit use.	Slight for Dickinson and Lamont soils, drouthiness limits use; severe for Ade, Bloomfield, Blown-Out Land, Plainfield, and Sparta soils. Sandy surface texture, blowing, drouthiness, and low inherent fertility limit use, difficult to maintain vegetation. All of these soils are a source of sand for greens.
Group 3. Excessively to moderately well-drained, moderately and strongly sloping soils on uplands and terraces.	Slight for 4 to 7 percent slopes; moderate for 7 to 12 percent slopes, slope limits use.	Slight for 4 to 7 percent slopes; moderate for 7 to 12 percent slopes, slope limits use; in addition to slope limitations, Ade, Bloomfield, Dickinson, Lamont, Plainfield, and Sparta soils have sandy surface texture and low inherent fertility, are drouthy, and are subject to blowing; it is difficult to maintain vegetation.	Slight for 4 to 7 percent slopes; moderate for 7 to 12 percent slopes, slope limits use; in addition to slope limitations, Ade, Bloomfield, Dickinson, Lamont, Plainfield, and Sparta soils have a sandy surface texture and low inherent fertility, are drouthy and subject to blowing; it is difficult to maintain vegetation.	Moderate for 4 to 7 percent slopes, slope limits use; severe for 7 to 12 percent slopes, slope limits use; in addition to slope limitations, Ade, Bloomfield, Dickinson, Lamont, Plainfield, and Sparta soils have a sandy surface texture and low inherent fertility, are drouthy, and subject to blowing; it is difficult to maintain vegetation.	Slight, except for Ade, Bloomfield, Dickinson, Lamont, Plainfield, and Sparta soils; they have moderate limitations caused by a sandy surface texture, low inherent fertility, and susceptibility to blowing.	Moderate, slope limits use; in addition to slope limitations, Ade, Bloomfield, Dickinson, Lamont, Plainfield, and Sparta soils have low inherent fertility, are drouthy, cause difficulty in maintenance of turf, but are a source of sand for greens.

Group 4. Excessively to moderately well-drained, very strongly sloping to very steep soils on uplands and terraces.	Severe, slope limits use.	Severe, slope limits use.	Severe, slope limits use.	Severe, slope limits use.	Moderate on 12 to 18 percent slopes. Severe on slopes exceeding 18 percent.	Severe, slope limits use. Bloomfield, Dickinson, Lamont, Plainfield, and Sparta soils are a source of sand for greens.
Group 5. Somewhat poorly drained, nearly level to strongly sloping soils on uplands and terraces.	Moderate, 12 to 36 inches to seasonal water table; high to moderate potential frost action; slopes on Loran soils range to 12 percent.	Moderate, 12 to 36 inches to seasonal water table; slopes on Loran soils range to 12 percent.	Moderate, 12 to 36 inches to seasonal water table; slopes on Loran soils range to 12 percent.	Moderate, 12 to 36 inches to seasonal water table; severe on slopes greater than 7 percent.	Moderate, 12 to 36 inches to seasonal water table.	Moderate, 12 to 36 inches to seasonal water table.
Group 6. Somewhat poorly drained to well-drained, nearly level soils on bottomlands.	Severe, subject to flooding; high potential frost action.	Severe, subject to flooding.	Severe, subject to flooding.	Severe, subject to flooding.	Moderate, subject to flooding.	Severe, subject to flooding.
Group 7. Poorly and very poorly drained, nearly level to very strongly sloping soils on uplands and terraces.	Severe, less than 12 inches to seasonal water table; soils dry slowly; moderate to high potential frost action; high to moderate shrink-swell potential in the subsoil. Some slopes on Coatsburg soils range to 18 percent.	Severe, less than 12 inches to seasonal water table; soils dry slowly; moderate to high potential frost action; drainage needed in most places; turf easily damaged when wet. Some slopes on Coatsburg soils range to 18 percent.	Severe, less than 12 inches to seasonal water table; soils dry slowly; drainage needed in most places; turf easily damaged when wet. Some slopes on Coatsburg soils range to 18 percent.	Severe, less than 12 inches to seasonal water table; soils dry slowly; drainage needed in most places. Some slopes on Coatsburg soils range to 18 percent.	Severe, less than 12 inches to seasonal water table; soils dry slowly; drainage needed in most places.	Severe, less than 12 inches to seasonal water table; soils dry slowly; drainage needed in most places; turf easily damaged when wet.
Group 8. Poorly and very poorly drained, nearly level soils on bottomlands or low terraces.	Severe, subject to flooding and ponding; less than 12 inches to seasonal water table; soils dry slowly; high to moderate potential frost action.	Severe, subject to flooding and ponding; less than 12 inches to seasonal water table; soils dry slowly; drainage needed in most places.	Severe, subject to flooding and ponding; less than 12 inches to seasonal water table; soils dry slowly; drainage needed in most places.	Severe, subject to flooding and ponding; less than 12 inches to seasonal water table; soils dry slowly; drainage needed in most places.	Severe, subject to flooding and ponding; less than 12 inches to seasonal water table; soils dry slowly; drainage needed in most places.	Severe, subject to flooding and ponding; less than 12 inches to seasonal water table; soils dry slowly; drainage needed in most places.

Group 1
Mapping units: 21B, 21C, 21C2, 21C3 (Pecatonica); 36A, 36B, 36B2, 36C, 36C2, 36C3, (Tama); 37A, 37B, 37C, (Worthen); 75B, 75C, 75C2, (Drury); 134A, 134B, 134C, 134C2, (Camden); 224C2, (Strawn); 227B, 227C, 227C2, (Argyle); 268B, 268C, 268C2, (Mt. Carroll); 274B, 274C, (Seaton); 277A, 277B, 277C, 277C2, (Port Byron); 279A, 279B, 279C, (Rozetta); 280B, 280B2, 280C, 280C2, (Fayette); 386A, 386B, 386C, 386C2, (Downs); 411B, 411C2, (Ashdale); 412C, 412C2, (Ogle); 414B, 414C, 414C2 (Myrtle); 416C, 416C2, (Durand); 419B, 419C, 419C2, (Flagg); 506C2, (Hitt); 546C2, (Keltner); 562B, 562C, 562C2, (Port Byron, sandy substratum); 563B, 563C, 563C2, (Seaton, sandy substratum); 564B, 564C, 564C2, (Waukegan); 565B, 565C, 565C2, (Tell); 574B, 574C, (Ogle, silt loam subsoil variant); 673B, (Onarga, reddish subsoil variant); 949C2, (Eleroy and Derinda); 951C, 951C2, (Palsgrove and Woodbine); 952C, 952C2, (Tell-Lamont complex).

Group 2
Mapping units: 53B, (Bloomfield); 54B, (Plainfield); 63, (Blown-Out Land); 87A, 87B, (Dickinson); 88A, 88B, (Sparta); 98A, 98B, (Ade); 175B, (Lamont).

Group 3
Mapping units: 21D, 21D2, 21D3, (Pecatonica); 30D2, (Hamburg); 36D, 36D2, 36D3, (Tama); 37D2, (Worthen); 53D, (Bloomfield); 54C3, (Plainfield); 75D2, (Drury); 87C, 87C2, (Dickinson); 88C, 88C2, 88D, (Sparta); 98C, 98D, (Ade); 134D2, (Camden); 175C, 175C2, 175D, 175D2, 175D3, (Lamont); 224D2, (Strawn); 227D2, (Argyle); 268D2, (Mt. Carroll); 274D, 274D2, 274D3, (Seaton); 277D, 277D2, 277D3, (Port Byron); 280D, 280D2, 280D3, (Fayette); 386D, 386D2, (Downs); 411D2, (Ashdale); 412D2, 412D3, (Ogle); 413D2, (Gale); 414D2, (Myrtle); 416D2, 416D3, (Durand); 419D, 419D2, 419D3, (Flagg); 505D2, 505D3, (Dunbarton); 506D2, 506D3, (Hitt); 546D2, (Keltner); 562D, 562D2, (Port Byron, sandy substratum); 563D, 563D2, 563D3, (Seaton, sandy substratum); 564D2, (Waukegan); 565D, 565D2, 565D3, (Tell); 577D, (Terrace Escarpments); 949D2, 949D3, (Eleroy and Derinda); 950C, 950C2, (Dubuque and Palsgrove); 951D, 951D2, 951D3, (Palsgrove and Woodbine); 952D2, 952D3, (Tell-Lamont complex); 972D2, (Casco-Fox complex).

Group 4
Mapping units: 19E3, 19F2, 19F3, 19G2, 19G3, (Sylvan); 21E, 21E2, 21E3, 21F, 21F2, 21F3, (Pecatonica); 30F2, 30G2, (Hamburg); 36E2, 36E3, (Tama); 53F, (Bloomfield); 54F2, (Plainfield); 75E2, 75F2, (Drury); 87E2, (Dickinson); 88E, (Sparta); 93E2, (Rodman); 134E2, (Camden); 175E2, 175E3, 175F2, 175F3, (Lamont); 224E2, 224E3, 224F2, 224F3, (Strawn); 227E2, (Argyle); 271E2, 271F2, 271G2, (Timula); 274E, 274E2, 274E3, 274F, 274F2, 274F3, 274G2, (Seaton); 280E, 280E2, 280E3, 280F, 280F2, 280F3, 280G, 280G2, (Fayette); 282E3, 282F3, (Chute); 386E, 386E2, (Downs); 411E3, (Ashdale); 412E2, (Ogle); 413F2, (Gale); 416E2, 416E3, (Durand); 419E2, 419E3, (Flagg); 504E2, 504G2, (Sogn); 505E, 505E2, 505E3, 505F, 505F2, 505F3, 505G, 505G2, 505G3, (Dunbarton); 506E2, 506F2, (Hitt); 511E3, 511F, 511F3, 511G2, (Dunbarton, cherty variant); 546E2, 546E3, 546F2, (Keltner); 563E3, (Seaton, sandy substratum); 564E2, (Waukegan); 565E2, 565E3, 565F2, 565F3, (Tell); 577E, 577F, (Terrace Escarpments); 949E2, 949E3, 949F2, (Eleroy and Derinda); 950D, 950D2, 950D3, 950E, 950E2, 950E3, 950F, 950F2, 950F3, 950G, 950G2, (Dubuque and Palsgrove); 951E, 951E2, 951E3, 951F, 951F2, 951F3, 951G2, 951G3, (Palsgrove and Woodbine); 952E2, 952E3, 952F, 952F2, 952F4, (Tell-Lamont complex); 972E2, 972E3, (Casco-Fox complex).

Group 5
Mapping units: 41A, 41B, (Muscatine); 61A, 61B, (Atterberry); 81A, 81B, 81C, (Littleton); 172, 237, 237+, (Hoopeston); 275A, 275B, (Joy); 572C, 572D, 572D2, (Loran).

Group 6
Mapping units: 77, (Huntsville); 239A, 239B, (Dorchester); 333, (Wakeland); 415, (Orion); 451, (Lawson); 455, (Mixed Alluvial Land); 578, (Dorchester, cobbly subsoil variant).

Group 7
Mapping units: 68, 68+, (Sable); 125, (Selma); 152, (Drummer); 201, (Gilford); 261, (Niota); 272, 272+, (Edgington); 568A, 568B, (Niota, clayey subsurface variant); 576A, 576B, 576C, (Zwingle); 660D2, 660D3, 660E2, 660E3, (Coatsburg).

Group 8
Mapping units: 76, $\overline{76}$, (Otter); 82, $\overline{82}$, (Millington); 100, $\overline{100}$, (Palms); 107, $\overline{107}$, 107+, (Sawmill); 210, $\overline{210}$, (Lena); $\overline{237}$, (Hoopeston), $\overline{239}$A, (Dorchester); $\overline{451}$, (Lawson).

PHYSICAL AND CHEMICAL PROPERTIES

Table 8 gives the measured or estimated physical and chemical properties and classification of Carroll County soils. Explanations of information in the table columns are as follows.

Columns 1 and 2. The map symbols refer to those found on the map sheets at the back of the report; the soil name includes the series name and dominant surface texture. In the case of land types the appropriate descriptive name is given.

Column 3. The "Depth to bedrock" column gives depth in feet from ground level to limestone or limestone residuum, sandstone, or shale bedrock if bedrock is encountered within 5 feet of the surface.

Column 4. The "Depth to seasonal high water table" column gives depth in feet from ground level to a free water table during the wettest season.

Column 5. The "Depth from surface" column gives depths from the ground surface for the major soil layers that are significant for engineering.

Estimates are made to a depth of 60 inches or to bedrock if encountered at less than 60 inches. For some of the soils, the material shown at the 60-inch depth can be expected to continue for many feet. This should be determined conclusively by on-site investigations.

The depths shown are for essentially uneroded sites, but the map symbols in Column 1 are for uneroded or slightly eroded, moderately eroded, and severely eroded conditions. The following explanation can be used when applying the interpretations to a specific map symbol. No digit after the slope letter indicates the soil is uneroded or slightly eroded and has the same or similar kinds and thicknesses of layers as shown in Column 5. A "2" following the slope letter indicates the soil is generally moderately eroded; this means that some of the material shown in the table as lying below a 10- or 12-inch depth may actually have been mixed with the original surface layer through tillage and the existing surface layer may thus tend to be influenced by the properties of the upper subsoil. A "3" after the slope letter indicates that about the first foot of material shown has eroded away and the material below 10 or 12 inches (generally subsoil) is now exposed at the surface.

Columns 6, 7, and 8. The columns under "Classification" refer to the USDA Texture and Unified and AASHO Classification Systems, respectively. The USDA Texture System is based on the relative proportion of various size groups of individual soil grains in a mass of soil. Soil material smaller than 2 millimeters in diameter is classified in three size fractions as sand, silt, or clay. The percentages of the three size fractions determine the textural class names, such as sandy loam, silt loam, or silty clay loam.

The Unified Classification System is based on the identification of soils according to particle size, plasticity, and liquid limit. SP is clean sands. SM and SC are sands with nonplastic or plastic fines. GW and GP are clean gravels, and GM is gravelly soils with nonplastic or plastic fines. ML and CL are nonplastic or plastic fine-grained materials with low liquid limit. MH and CH are primarily nonplastic or plastic fine-grained materials with high liquid limit. OH is organic clays of medium to high plasticity and high liquid limit. Pt refers to highly organic soils such as mucks or peats.

The American Association of State Highway Officials (AASHO) System is based on the field performance of highways. Soils having about the same general load-carrying capacity and service properties are grouped into seven basic groups. The best soils for road subgrades are classified as A-1; the poorest, A-7. These seven groups can be further divided into subgroups devised to approximate within-group evaluations.

In general, the USDA Texture, Unified, and AASHO columns show the dominant classification first. If dual classifications are shown, an "or" between them (such as, ML or CL) is used.

Columns 9, 10, and 11. The columns under "Percent passing sieve" list the measured or estimated percentages of material passing through the No. 4 (4.7 mm.), No. 10 (2.0 mm.), and No. 200 (.074 mm.) sieves for each major layer. Where 100 percent of the sample is listed as passing a given sieve size, 1 to 2 percent in some samples will not pass. The values in all samples were rounded off to the nearest 5 percent, because more accurate estimates are impractical. Most soils will fall within the range given, but the grain size of any soil varies considerably. Therefore, it should not be assumed that all samples of a specific soil will fall within the range shown nor that the engineering classification will invariably be as given.

Column 12. The "Permeability" column refers to rate of water movement downward through undisturbed soil or substratum. Permeability was predicted by comparison with soils of known permeability and estimates based on the soils' texture, structure, and consistence. Permeability is shown as the range within which the soil normally will fall. Rates, in inches per hour, are very slow, less than 0.06; slow, 0.06 to 0.2; moderately slow, 0.2 to 0.6; moderate, 0.6 to 2.0; moderately rapid, 2.0 to 6.0; and rapid, 6.0 to 20.0.

Column 13. The "Available water capacity" column gives the estimated inches of available water per inch of soil for the major soil layers. The figures given represent the estimated range of available water within the major layers of each soil. Cumulative totals, by major layers to 60-inch depths, of available water in in. in. can be calculated to give total available water. Numerical ranges per 60-inch depth in Carroll County are very low, less than 3 inches; low, 3 to 6 inches; moderate, 6 to 9 inches; high, 9 to 12 inches; very high, 12 inches or more.

TABLE 8. — SOILS OF CARROLL COUNTY, ILLINOIS, AND THEIR ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

Symbol on map	Soil name	Depth to bedrock	Depth to seasonal high water table	Depth from surface (inches)	Classification: USDA Texture	Classification: Unified	Classification: AASHO	Percent passing sieve: No. 4	Percent passing sieve: No. 10	Percent passing sieve: No. 200	Permeability (in./hr.)	Available water capacity (in./in. of soil)[a]	Reaction (pH)	Shrink-swell potential	Corrosivity potential for concrete conduits[b]
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
98A	Ade loamy fine		Greater than	0-40	Loamy fine sand	SM	A-2	100	100	15-30	6.0 -20.0	.09 - .12	6.1 - 6.5	Low	Moderate
98B	sand		3 feet	40-60	Fine sand	SM	A-2	100	100	20-35	6.0 -20.0	.05 - .07	6.1 - 7.3	Low	Moderate
98C															
98D															
227B	Argyle silt loam		Greater than	0-12	Silt loam	CL or ML	A-6 or A-4	100	100	70-90	.6 - 2.0	.22 - .24	5.6 - 6.0	Low to mod.	--
227C			3 feet	12-24	Silty clay loam	CL	A-6 or A-7	100	100	85-95	.6 - 2.0	.18 - .20	5.1 - 6.0	Moderate	Moderate
227C2				24-42	Gravelly clay loam	CL	A-6 or A-7	85-95	75-90	55-85	.6 - 2.0	.14 - .16	5.1 - 5.5	Moderate	Low
227D2				42-70	Gr. sandy clay loam	SC or CL	A-6	85-95	75-90	35-55	.6 - 2.0	.15 - .17	5.1 - 5.5	Moderate	Moderate
227E2															
411B	Ashdale silt	3 to 5 feet to	Greater than	0-8	Silt loam	CL or ML	A-6 or A-7	100	100	95-100	.6 - 2.0	.22 - .24	6.6 - 7.3	Moderate	--
411C2	loam	limestone or	3 feet	8-42	Silty clay loam	CL	A-7	100	100	95-100	.6 - 2.0	.18 - .20	5.6 - 6.5	Moderate	Moderate
411D2		residuum		42-49	Clay	CH	A-7	100	100	75-95	.06- .6	.08 - .10	6.1 - 6.5	High	Moderate
411E3				49-60	Limestone bedrock	--	--	--	--	--	Variable	--	Calcareous	--	--
61A	Atterberry silt		1½ to 2½ feet	0-20	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	5.1 - 7.8	Low to mod.	--
61B	loam			20-44	Silty clay loam	CL	A-7	100	100	95-100	.6 - 2.0	.18 - .20	5.1 - 6.0	Moderate	Moderate
				44-60	Silt loam	CL or ML	A-6 or A-4	100	100	95-100	.6 - 2.0	.20 - .22	6.1 - 7.3	Low to mod.	Low
53B	Bloomfield		Greater than	0-36	Fine sand	SM	A-2	100	100	15-30	6.0 -20.0	.09 - .12	5.6 - 6.0	Low	Moderate
53D	fine sand		3 feet	36-60	Fine sand	SM	A-2	100	100	15-30	6.0 -20.0	.09 - .12	5.6 - 6.5	Low	Moderate
53F					(Sandy loam bands)	SM	A-2 or A-4	100	100	30-40	2.0 - 6.0	.11 - .13	5.6 - 6.5	Low	Moderate
63	Blown-Out Land		Greater than 3 feet	0-60	Sand	SP or SM	A-3	100	90-100	5-10	6.0 -20.0	.04 - .07	5.1 - 6.0	Low	High
134A	Camden silt loam		Greater than	0-9	Silt loam	CL or ML	A-6 or A-4	100	100	95-100	.6 - 2.0	.22 - .24	5.6 - 6.0	Low to mod.	--
134B			2½ feet	9-31	Silty clay loam	CL	A-7	100	100	95-100	.6 - 2.0	.18 - .20	5.6 - 6.5	Moderate	Moderate
134C				31-44	Clay loam	CH	A-7	100	100	70-80	.6 - 2.0	.15 - .19	5.6 - 6.0	Moderate	Moderate
134C2				44-60	Silty clay (strata)	CH	A-7	100	100	90-95	Less than .06	.15 - .18	5.6 - 7.3	High	Moderate
134D2					Sandy loam (strata)	SM	A-2 or A-4	100	100	30-40	2.0 - 6.0	.10 - .12	5.6 - 7.3	Low	Moderate
134E2					Loamy sand (strata)	SP or SM	A-3	100	95-100	5-10	6.0 -20.0	.05 - .07	5.6 - 7.3	Low	Moderate
972 or XD2	Casco silt loam.		Greater than	0-6	Silt loam	ML or CL	A-4 or A-6	100	95-100	70-90	.6 - 2.0	.22 - .24	6.1 - 6.5	Low	--
972 or XE2	Mapped only in		3 feet	6-15	Silty clay loam	CL	A-6 or A-7	100	85-100	85-95	.6 - 2.0	.18 - .20	6.6 - 7.3	Low to mod.	Moderate
972 or XE3	complex with Fox			15-60	Loamy gravel	GM or GC	A-1	50-80	25-70	5-25	6.0 -20.0	.02 - .04	7.9 - 8.4	Low	Low
	series. See Fox.												Calcareous		
282E3	Chute fine sand		Greater than	0-60	Fine sand	SM	A-2	100	100	20-35	6.0 -20.0	.05 - .07	6.6 - 8.4	Low	Low
282F3			3 feet										Calcareous		
660D2	Coatsburg silt		1½ to 2½ feet	0-15	Silt loam	CL	A-6	100	100	95-100	.6 - 2.0	.22 - .24	6.1 - 7.3	Moderate	--
660D3	loam			15-36	Silty clay	CH	A-7	100	100	90-95	.06- .2	.11 - .13	5.1 - 6.5	High	Moderate
660E2				36-52	Silty clay loam	CL	A-7	100	100	85-95	.2 - .6	.11 - .13	5.1 - 5.5	Moderate	Moderate
660E3				52-60	Loam	ML or CL	A-4 or A-6	100	100	60-75	.6 - 2.0	.17 - .19	5.6 - 6.0	Low to mod.	Low
949C2	Derinda silt	1½ to 3 feet to	Greater than	0-6	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	6.1 - 6.5	Low to mod.	--
949D2	loam. Mapped	shale	1½ feet	6-21	Silty clay loam	CL	A-7	100	100	95-100	.6 - 2.0	.18 - .20	6.1 - 7.3	Mod. to high	Moderate
949D3	only in undiff-			21-60	Clay shale	--	--	--	--	--	Less than .2	--	Calcareous	High	Moderate
949E2	erentiated				bedrock										
949E3	units with														
949F2	Eleroy series.														
	See Eleroy also.														
87A	Dickinson sandy		Greater than	0-38	Sandy loam	SM	A-2 or A-4	100	100	30-40	2.0 - 6.0	.12 - .14	5.6 - 6.5	Low	Moderate
87B	loam		3 feet	38-60	Sand	SP	A-3	100	100	0-5	6.0 -20.0	.05 - .07	5.6 - 6.5	Low	Low
87C															
87C2															
87E2															
239A	Dorchester silt		1 to 3 feet	0-60	Silt loam	ML or CL	A-4 or A-6	100	100	70-90	.6 - 2.0	.20 - .24	7.9 - 8.4	Low to mod.	Low
239A	loam												Calcareous		
239B															
578	Dorchester silt	2 to 3 feet to	1 to 3 feet	0-30	Silt loam	ML or CL	A-4 or A-6	100	100	70-90	.6 - 2.0	.20 - .24	7.9 - 8.4	Low to mod.	Low
	loam, cobbly	cobbly material											Calcareous		
	subsoil variant			30-60	Chert and limestone fragments	--	--	--	--	--	6.0 -20.0	Less than .02	7.4 - 8.4 Calcareous	Low	Low

(Footnotes given at end of table.)

TABLE 8 (cont.).

Symbol on map (1)	Soil name (2)	Depth to bedrock (3)	Depth to seasonal high water table (4)	Depth from surface (inches) (5)	Classification: USDA Texture (6)	Unified (7)	AASHO (8)	Percent passing sieve: No. 4 (9)	No. 10 (10)	No. 200 (11)	Permeability (in./hr.) (12)	Available water capacity (in./in. of soil)[a] (13)	Reaction (pH) (14)	Shrink-swell potential (15)	Corrosivity potential for concrete conduits (16)[b]
386A 386B 386C 386C2 386D 386D2 386E 386E2	Downs silt loam		Greater than 2½ feet	0-14	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	4.5 - 6.5	Low to mod.	--
				14-54	Silty clay loam	CL	A-6 or A-7	100	100	95-100	.6 - 2.0	.18 - .20	5.1 - 6.0	Moderate	Moderate
				54-60	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.20 - .22	5.6 - 6.0	Low to mod.	Low
152	Drummer silty clay loam		Less than 1½ feet	0-21	Silty clay loam	CL, CH, or OH	A-7	100	100	95-100	.6 - 2.0	.21 - .23	6.6 - 7.3	High	--
				21-47	Silty clay loam	CL or CH	A-7 or A-6	100	100	95-100	.6 - 2.0	.18 - .20	6.6 - 7.3	Mod. to high	Low
				47-60	Silt loam	ML or CL	A-4 or A-6	100	100	70-90	.6 - 2.0	.20 - .22	7.4 - 7.8	Low to mod.	Low
75B 75C 75C2 75D2 75E2 75F2	Drury silt loam		Greater than 3 feet	0-60	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.20 - .24	5.1 - 6.0	Low to mod.	Low
950C 950C2 950D 950D2 950D3 950E 950E2 950E3 950F 950F2 950F3 950G 950G2	Dubuque silt loam. Mapped only in undifferentiated units with Palsgrove series. See Palsgrove also.	1½ to 3 feet to limestone or residuum	Greater than 3 feet	0-7	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	5.1 - 6.0	Low to mod.	--
				7-25	Silty clay loam	CL	A-6 or A-7	100	100	95-100	.6 - 2.0	.20 - .22	6.1 - 6.5	Moderate	Moderate
				25-29	Clay	CH	A-7	100	100	95-100	.06- .6	.09 - .11	7.4 - 7.8	High	Moderate
				29-60	Limestone bedrock	--	--	--	--	--	Variable	--	Calcareous	--	--
505D2 505D3 505E 505E2 505E3 505F 505F2 505F3 505G 505G2 505G3	Dunbarton silt loam	Less than 1½ feet to limestone and residuum	Greater than 2 feet	0-10	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	5.6 - 7.3	Low to mod.	--
				10-19	Clay	CH	A-7	100	100	95-100	.06- .6	.09 - .11	7.4 - 7.8	High	--
				19-60	Limestone bedrock	--	--	--	--	--	--	--	Calcareous	--	--
511E3 511F 511F3 511G2	Dunbarton silt loam, cherty variant	Less than 1½ feet to limestone and residuum	Greater than 2 feet	0-5	Silt loam	ML or CL	A-4 or A-6	70-90	70-90	50-70	.6 - 2.0	.22 - .24	6.6 - 7.3	Low to mod.	--
				5-14	Cherty silty clay	CH	A-7	90-95	90-95	85-95	.06- .6	.11 - .13	6.6 - 7.3	High	--
				14-60	Limestone bedrock	--	--	--	--	--	--	--	Calcareous		--
416C 416C2 416D2 416D3 416E2 416E3	Durand silt loam		Greater than 3 feet	0-15	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	6.6 - 7.3	Moderate	--
				15-24	Silty clay loam	CL	A-6 or A-7	100	100	70-95	.6 - 2.0	.18 - .20	5.1 - 5.5	Moderate	Moderate
				24-60	Clay loam	CL	A-6 or A-7	100	100	70-80	.6 - 2.0	.14 - .16	5.1 - 6.0	Moderate	Moderate
272 272+	Edgington silt loam		Less than 1½ feet	0-31	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	5.1 - 6.5	Low to mod.	Moderate
				31-55	Silty clay loam	CL	A-7	100	100	95-100	.06- .6	.15 - .18	5.1 - 6.0	Moderate	Moderate
				55-60	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.20 - .22	6.1 - 6.5	Low to mod.	Moderate
949C2 949D2 949D3 949E2 949E3 949F2	Eleroy silt loam. Mapped only as undifferentiated units with Derinda series. See Derinda also.	3 to 5 feet to shale	Greater than 3 feet	0-12	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	6.1 - 6.5	Low to mod.	--
				12-41	Silty clay loam	CL	A-6 or A-7	100	100	95-100	.6 - 2.0	.18 - .20	5.6 - 6.5	Mod. to high	Moderate
				41-60	Clay shale bedrock	--	--	--	--	--	Less than .2	--	Calcareous	High	Low

280B	Fayette silt		Greater than	0-13	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	5.1 - 7.3	Low to mod.	--
280B2	loam		3 feet	13-47	Silty clay loam	CL	A-7 or A-6	100	100	95-100	.6 - 2.0	.18 - .20	5.6 - 6.0	Moderate	Moderate
280C				47-60	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.20 - .22	6.1 - 6.5	Low to mod.	Low
280C2															
280D															
280D2															
280D3															
280E															
280E2															
280E3															
280F															
280F2															
280F3															
280G															
280G2															
419B	Flagg silt loam		Greater than	0-10	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	6.6 - 7.3	Low to mod.	--
419C			3 feet	10-39	Silty clay loam	CL	A-6 or A-7	100	100	95-100	.6 - 2.0	.18 - .20	5.1 - 6.0	Moderate	Moderate
419C2				39-60	Clay loam	CL	A-6 or A-7	100	100	70-80	.6 - 2.0	.14 - .16	5.6 - 7.3	Moderate	Moderate
419D															
419D2															
419D3															
419E2															
419E3															
972 or XD2	Fox silt loam.		Greater than	0-9	Silt loam	ML or CL	A-4 or A-6	100	100	70-90	.6 - 2.0	.22 - .24	5.6 - 7.3	Low to mod.	--
972 or XE2	Mapped only in		3 feet	9-22	Silty clay loam	CL	A-6 or A-7	100	100	85-95	.6 - 2.0	.18 - .20	6.1 - 6.5	Moderate	Moderate
972 or XE3	complex with			22-39	Clay loam	CL	A-6 or A-7	100	100	70-80	.6 - 2.0	.15 - .19	6.1 - 7.3	Moderate	Moderate
	Casco series.			39-60	Gravelly clay loam	CL	A-6 or A-7	100	75-90	55-85	.6 - 2.0	.15 - .19	7.9 - 8.4	Moderate	Moderate
	See Casco also.				and limestone										
					gravel	GP or GW	A-1		40-80	30-70	0-10	6.0 -20.0	.02 - .04	7.9 - 8.4 Calcareous	Low	Low
413D2	Gale silt loam	3 to 5 feet to	Greater than	0-23	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	5.1 - 6.5	Low to mod.	--
413F2		sandstone	3 feet	23-33	Silty clay loam	CL	A-6 or A-7	100	100	95-100	.6 - 2.0	.18 - .20	5.1 - 5.5	Moderate	Moderate
				33-38	Sandy loam	SM	A-2 or A-4	100	100	30-40	2.0 - 6.0	.12 - .14	5.1 - 5.5	Low	Low
				38-50	Sand	SP	A-3	100	100	0-5	Greater than 20	.05 - .07	5.6 - 6.0	--	--
				50-60	Sandstone bedrock	--	--	--	--	--	Variable	--	5.6 - 6.0	--	--
201	Gilford fine		Less than 1	0-35	Fine sandy loam	SM or ML	A-2 or A-4	100	100	40-55	2.0 - 6.0	.16 - .18	6.1 - 7.3	Low	Moderate
	sandy loam		foot	35-44	Sandy loam	SM	A-2 or A-4	100	100	30-40	2.0 - 6.0	.12 - .14	6.6 - 7.3	Low	Low
				44-60	Loamy sand	SM	A-2	100	100	15-30	6.0 -20.0	.08 - .10	6.6 - 7.3	Low	Moderate
30D2	Hamburg silt		Greater than	0-60	Coarse silt loam	ML	A-4	100	100	90-100	.6 - 6.0	.14 - .19	7.4 - 8.4 Calcareous	Low	Low
30F2	loam		3 feet												
30G2															
506C2	Hitt silt loam	3 to 5 feet to	Greater than	0-15	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	6.1 - 6.5	Low to mod.	--
506D2		limestone or	3 feet	15-19	Silty clay loam	CL	A-6 or A-7	100	100	95-100	.6 - 2.0	.18 - .20	5.6 - 6.0	Mod. to high	Moderate
506D3		residuum		19-37	Clay loam	CL	A-6 or A-7	100	100	70-80	.6 - 2.0	.15 - .19	5.1 - 5.5	Mod. to high	Moderate
506E2				37-42	Silty clay	CH	A-7	100	100	90-95	.06- .6	.11 - .13	5.6 - 6.0	High	Moderate
506F2				42-60	Limestone bedrock	--	--	--	--	--	Variable	--	7.4 - 8.4 Calcareous	--	--
237	Hoopeston loam		1 to 1½ feet	0-8	Loam	ML or CL	A-4 or A-6	100	100	60-75	.6 - 2.0	.20 - .22	6.6 - 7.3	Low	--
237+				8-28	Sandy loam	SM	A-2 or A-4	100	100	30-40	2.0 - 6.0	.12 - .14	6.1 - 7.3	Low	Low
237				28-60	Loamy sand	SM	A-2	100	100	15-30	2.0 - 6.0	.08 - .11	6.6 - 7.8	Low	Moderate
172	Hoopeston sandy		1 to 2½ feet	0-28	Sandy loam	SM	A-2 or A-4	100	100	30-40	2.0 - 6.0	.12 - .14	6.1 - 7.3	Low	--
	loam			28-60	Loamy sand	SM	A-2	100	100	15-30	2.0 - 6.0	.08 - .11	6.6 - 7.3	Low	Moderate
77	Huntsville silt		Greater than	0-60	Silt loam	CL or ML	A-6 or A-4	100	100	70-90	.6 - 2.0	.20 - .24	6.1 - 7.3	Low to mod.	Low
	loam		2½ feet												
275A	Joy silt loam		2 to 3 feet	0-17	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	5.6 - 7.3	Low to mod.	Moderate
275B				17-60	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.20 - .22	5.1 - 6.5	Low to mod.	Moderate
546C2	Keltner silt	3 to 5 feet	Greater than	0-12	Silt loam	CL	A-6	100	100	95-100	.6 - 2.0	.22 - .24	5.6 - 6.5	Moderate	--
546D2	loam	to shale	3 feet	12-31	Silty clay loam	CL	A-6 or A-7	100	100	95-100	.6 - 2.0	.18 - .20	5.6 - 7.3	Moderate	Moderate
546E2				31-40	Silty clay	CH	A-7	100	100	90-95	.06- .2	.11 - .13	7.4 - 7.8	Mod. to high	Moderate
546E3				40-60	Clay shale	--	--	--	--	--	Less than .2	--	Calcareous	High	Low
546F2					bedrock										

(Footnotes given at end of table.)

TABLE 8 (cont.).

Symbol on map	Soil name	Depth to bedrock	Depth to seasonal high water table	Depth from surface (inches)	Classification: USDA Texture	Classification: Unified	Classification: AASHO	Percent passing sieve: No. 4	Percent passing sieve: No. 10	Percent passing sieve: No. 200	Permeability (in./hr.)	Available water capacity (in./in. of soil)[a]	Reaction (pH)	Shrink-swell potential	Corrosivity potential for concrete conduits
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)[b]
175B	Lamont fine		Greater than	0-40	Fine sandy loam	SM or ML	A-2 or A-4	100	100	40-55	2.0 - 6.0	.11 - .14	5.6 - 7.3	Low	Moderate
175C	sandy loam. In		3 feet	40-60	Fine sand	SM	A-2	100	100	20-35	6.0 -20.0	.05 - .08	6.1 - 6.5	Low	Moderate
175C2	areas of 952 or														
175D	Z symbols occurs														
175D2	as undifferent-														
175D3	iated units with														
175E2	Tell series.														
175E3	See Tell also.														
175F2															
175F3															
952 or ZC															
952 or ZC2															
952 or ZD2															
952 or ZD3															
952 or ZE2															
952 or ZE3															
952 or ZF															
952 or ZF2															
952 or ZF4															
451/451	Lawson silt loam		1 to 2½ feet	0-60	Silt loam	CL or ML	A-6 or A-4	100	100	70-90	.6 - 2.0	.20 - .24	6.6 - 7.8	Moderate	Low
210/210	Lena muck		Less than 1 foot	0-60	Muck	Pt	--	--	--	--	.6 - 6.0	Greater than .25[c]	7.9 - 8.4 Calcareous	Low to mod.	Low
81A	Littleton silt		1½ to 2½ feet	0-30	Silt loam	ML or CL	A-4 or A-6	100	100	70-90	.6 - 2.0	.22 - .24	6.1 - 7.3	Moderate	Moderate
81B	loam			30-60	Silt loam	ML or CL	A-4 or A-6	100	100	70-90	.6 - 2.0	.20 - .22	6.1 - 7.3	Low to mod.	Low
81C															
572C	Loran silt loam	3 to 5 feet to	Greater than 2	0-11	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	6.1 - 7.3	Moderate	
572D		shale	feet	11-44	Silty clay loam	CL	A-6 or A-7	100	100	95-100	.6 - 2.0	.18 - .20	6.6 - 7.3	Mod. to high	Moderate
572D2				44-48	Silty clay to clay	CH	A-7	100	100	75-95	.06- .2	.08 - .12	7.4 - 7.8	High	Low
				48-60	Clay shale bedrock	--	--	--	--	--	Less than .2	--	Calcareous	High	Low
82/82	Millington silt loam		Less than 1 foot	0-60	Silt loam or loam	CL or ML	A-6 or A-4	100	100	60-90	.6 - 2.0	.17 - .22	7.4 - 8.4	Moderate	Low
455	Mixed Alluvial Land	Physical and chemical properties are not given for Mixed Alluvial Land. This land was not studied in the detailed mapping of Carroll County because of its inaccessibility.													
268B	Mt. Carroll silt		Greater than	0-60	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.20 - .24	5.1 - 7.3	Low to mod.	Moderate
268C	loam		2½ feet												
268C2															
268D2															
41A	Muscatine silt		1½ to 2½ feet	0-14	Silt loam	CL or ML	A-6	100	100	95-100	.6 - 2.0	.22 - .24	5.1 - 5.5	Moderate	--
41B	loam			14-55	Silty clay loam	CL or CH	A-7	100	100	95-100	.6 - 2.0	.18 - .20	5.1 - 6.5	Mod. to high	Moderate
				55-70	Silt loam	CL or ML	A-6 or A-4	100	100	95-100	.6 - 2.0	.20 - .22	6.1 - 7.3	Moderate	Low
414B	Myrtle silt loam		Greater than 3	0-13	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	5.6 - 6.0	Low to mod.	--
414C			feet	13-40	Silty clay loam	CL	A-6 or A-7	100	100	95-100	.6 - 2.0	.18 - .20	4.5 - 5.5	Moderate	Moderate
414C2				40-60	Clay loam	CL	A-6 or A-7	100	100	70-80	.6 - 2.0	.14 - .16	5.6 - 6.0	Moderate	Low
414D2															
261	Niota silt loam		Less than 2	0-17	Silt loam	CL or ML	A-6 or A-4	100	100	95-100	.2 - 2.0	.22 - .24	5.6 - 7.3	Moderate	--
			feet	17-20	Silty clay loam	CH	A-7	100	100	95-100	Less than .06	.18 - .20	4.5 - 5.0	High	Moderate
				20-60	Clay	CH	A-7	100	100	75-95	Less than .06	.08 - .11	4.5 - 8.4 Calcareous	High	Moderate
568A	Niota silty clay		Less than 1	0-9	Silty clay loam	CL, CH, or OH	A-7	100	100	95-100	.2 - .6	.21 - .23	6.6 - 7.3	Mod. to high	--
568B	loam, clayey		foot												
	subsurface			9-31	Silty clay	CH or MH	A-7	100	100	95-100	Less than .06	.11 - .13	4.5 - 5.5	High	Low
	variant			31-62	Stratified:										
					Silty clay loam	CL or MH	A-7	100	100	95-100	.2 - .6	.18 - .20	6.6 - 7.8	Moderate	Low
					Silty clay and clay	CH or MH	A-7	100	100	95-100	Less than .06	.08 - .12	6.6 - 7.8	High	Low

412C 412C2 412D2 412D3 412E2	Ogle silt loam	Greater than 3 feet	0-15	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	5.6 - 6.5	Low to mod.	--
			15-40	Silty clay loam	CL	A-6 or A-7	100	100	70-90	.6 - 2.0	.14 - .20	5.1 - 6.0	Moderate	Moderate
			40-60	Clay loam	CL	A-6 or A-7	100	100	70-80	.6 - 2.0	.15 - .19	5.6 - 6.0	Moderate	Moderate
574B 574C	Ogle silt loam, silt loam subsoil variant	Greater than 3 feet	0-14	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	5.6 - 6.5	Low to mod.	--
			14-36	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.20 - .22	5.1 - 5.5	Low to mod.	Moderate
			36-60	Clay loam	CL	A-6 or A-7	100	100	70-80	.6 - 2.0	.15 - .19	5.6 - 6.5	Moderate	Moderate
673B	Onarga fine sandy loam, reddish subsoil variant	Greater than 3 feet	0-41	Fine sandy loam	SM or ML	A-4	100	100	40-55	2.0 - 6.0	.15 - .18	6.1 - 7.3	Low	Moderate
			41-45	Sandy clay loam	SC or CL	A-6	85-95	75-90	35-55	.6 - 2.0	.14 - .16	6.1 - 6.5	Low	Moderate
			45-57	Clay loam	CL	A-6 or A-7	100	100	70-80	.6 - 2.0	.13 - .15	5.6 - 6.0	Moderate	Moderate
			57-60	Loamy sand	SM	A-2	100	100	15-30	6.0 -20.0	.08 - .10	5.6 - 6.0	Low	Low
415	Orion silt loam	1 to 2½ feet	0-32	Silt loam	ML or CL	A-4 or A-6	100	100	70-90	.6 - 2.0	.22 - .24	6.6 - 7.3	Low to mod.	Low
			32-60	Silt loam	ML or CL	A-6	100	100	70-90	.6 - 2.0	.20 - .22	7.4 - 7.8	Low to mod.	Low
76/76	Otter silt loam	Less than 1 foot	0-60	Silt loam	ML or CL	A-4 or A-6	100	100	70-90	.6 - 2.0	.20 - .24	6.1 - 7.8	Low to mod.	Low
100/100	Palms muck	Less than 1 foot	0-25	Muck	Pt	--	--	--	--	.6 - 6.0	Greater than .25[c]	6.6 - 7.8	Low to mod.	Moderate
			25-60	Silt loam	ML or CL	A-4 or A-6	100	100	70-90	.6 - 2.0	.20 - .22	7.4 - 7.8	Low to mod.	Low
951 or YC 951 or YC2 951 or YD 951 or YD2 951 or YD3 951 or YE 951 or YE2 951 or YE3 951 or YF 951 or YF2 951 or YF3 951 or YG2 951 or YG3	Palsgrove silt loam. 3 to 5 feet to limestone. In areas of 951 or Y symbols occurs as undifferentiated units with Woodbine series. See Woodbine also. In areas of 950 symbols occurs as undifferentiated units with Dubuque series. See Dubuque also.	Greater than 3 feet	0-14	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	6.1 - 7.3	Low to mod.	--
			14-46	Silty clay loam	CL	A-6 or A-7	100	100	95-100	.6 - 2.0	.18 - .20	5.1 - 6.0	Moderate	Moderate
			46-51	Silty clay	CH	A-7	100	100	90-95	.06- .6	.10 - .12	6.1 - 6.5	High	Moderate
			51-60	Limestone bedrock	--	--	--	--	--	Variable	--	Calcareous	--	--
21B 21C 21C2 21C3 21D 21D2 21D3 21E 21E2 21E3 21F 21F2 21F3	Pecatonica silt loam	Greater than 3 feet	0-10	Silt loam	CL or ML	A-6, A-4 or OL	100	100	70-90	.6 - 2.0	.22 - .24	6.1 - 6.5	Low to mod.	--
			10-53	Silty clay loam to clay loam	CL	A-6 or A-7	95-100	95-100	55-90	.6 - 2.0	.15 - .20	5.6 - 7.3	Moderate	Moderate
			53-60	Loam	ML or CL	A-4 or A-6	95-100	90-100	60-75	.6 - 2.0	.17 - .19	7.4 - 7.8 Calcareous	Low to mod.	Low
54B 54C3 54F2	Plainfield sand	Greater than 3 feet	0-60	Sand	SP	A-3	100	100	0-5	6.0 -20.0	.04 - .08	5.6 - 6.0	Low	Moderate
277A 277B 277C 277C2 277D 277D2 277D3	Port Byron silt loam	Greater than 3 feet	0-18	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	5.6 - 7.3	Low to mod.	--
			18-60	Heavy silt loam	CL or ML	A-6 or A-4	100	100	95-100	.6 - 2.0	.20 - .22	5.1 - 6.5	Low to mod.	Moderate
562B 562C 562C2 562D 562D2	Port Byron silt loam, sandy substratum	Greater than 3 feet	0-35	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	5.1 - 6.0	Low to mod.	Moderate
			35-44	Loam	ML or CL	A-4 or A-6	100	100	60-75	.6 - 2.0	.17 - .19	5.1 - 5.5	Low	Moderate
			44-70	Fine sand	SM	A-2 or A-3	100	100	20-35	6.0 -20.0	.05 - .07	5.6 - 6.0	Low	Low

(Footnotes given at end of table.)

TABLE 8 (cont.).

Symbol on map (1)	Soil name (2)	Depth to bedrock (3)	Depth to seasonal high water table (4)	Depth from surface (inches) (5)	Classification: USDA Texture (6)	Unified (7)	AASHO (8)	Percent passing sieve: No. 4 (9)	No. 10 (10)	No. 200 (11)	Permeability (in./hr.) (12)	Available water capacity (in./in. of soil)[a] (13)	Reaction (pH) (14)	Shrink-swell potential (15)	Corrosivity potential for concrete conduits (16)[b]
93E2	Rodman gravelly loam		Greater than 3 feet	0-10	Gravelly loam	ML or CL	A-4 or A-6	100	100	60-75	.6 - 2.0	.15 - .17	7.4 - 7.8 Calcareous	Low to mod.	--
				10-60	Loamy gravel	GM or GC	A-1	50-80	25-70	5-25	Greater than 20	.02 - .04	7.9 - 8.4 Calcareous	Low	Low
279A 279B 279C	Rozetta silt loam		2 to 3 feet	0-19	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	5.1 - 5.5	Low to mod.	--
				19-45	Silty clay loam	CL	A-7 or A-6	100	100	95-100	.6 - 2.0	.18 - .20	5.1 - 6.0	Moderate	Moderate
				45-60	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.20 - .22	6.1 - 6.5	Low to mod.	Low
68 68+	Sable silty clay loam		Less than 1 foot	0-17	Silty clay loam	CH, CL, or OH	A-7	100	100	95-100	.6 - 2.0	.21 - .23	6.6 - 7.3	High	--
				17-49	Silty clay loam	CL or CH	A-6 or A-7	100	100	95-100	.6 - 2.0	.19 - .21	6.6 - 7.8	Mod. to high	Low
				49-60	Silt loam	CL	A-6	100	100	95-100	.6 - 2.0	.20 - .22	7.4 - 8.4 Calcareous	Moderate	Low
107 107 107+	Sawmill silty clay loam		Less than 1 foot	0-48	Silty clay loam	CL, CH or MH	A-7	100	100	85-95	.2 - 2.0	.21 - .23	6.6 - 7.8	High	Low
				48-60	Silt loam	CL	A-6	100	100	70-90	.6 - 2.0	.20 - .22	7.4 - 7.8 Calcareous	Mod. to high	Low
274B 274C 274D 274D2 274D3 274E 274E2 274E3 274F 274F2 274F3 274G2	Seaton silt loam		Greater than 3 feet	0-17	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	5.1 - 6.0	Low to mod.	--
				17-60	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.20 - .22	5.6 - 7.3	Low to mod.	Moderate
563B 563C 563C2 563D 563D2 563D3 563E3	Seaton silt loam, sandy substratum		Greater than 3 feet	0-43	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.20 - .24	5.1 - 7.3	Low to mod.	Moderate
				43-60	Fine sand	SM	A-2	100	100	20-35	6.0 -20.0	.05 - .07	5.6 - 6.0	Low	Moderate
125	Selma loam		Less than 1 foot	0-14	Loam	ML or CL	A-4 or A-6	100	100	60-75	.6 - 2.0	.21 - .23	6.6 - 7.3	Low to mod.	--
				14-38	Clay loam	CL	A-6 or A-7	100	100	70-80	.6 - 2.0	.16 - .20	6.6 - 7.3	Moderate	Low
				38-43	Sandy loam	SM	A-2 or A-4	100	100	30-40	2.0 - 6.0	.12 - .14	6.6 - 7.3	Low to mod.	Low
				43-60	Sand	SP	A-3	100	100	0-5	6.0 -20.0	.06 - .08	6.6 - 7.3	Low	Low
504E2 504G2	Sogn silt loam	Less than 1½ feet to limestone	Greater than 3 feet	0-6	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.22 - .24	7.4 - 7.8 Calcareous	Low to mod.	--
				6-60	Limestone bedrock	--	--	--	--	--	Variable	--		--	--
88A 88B 88C 88C2 88D 88E	Sparta loamy sand		Greater than 3 feet	0-20	Loamy sand	SM	A-2	100	100	10-30	Greater than 20	.09 - .11	6.1 - 6.5	Low	--
				20-33	Loamy sand	SM or SP	A-3	100	100	5-30	Greater than 20	.08 - .10	5.6 - 6.0	Low	Moderate
				33-60	Sand	SP	A-2 or A-3	100	95-100	0-5	Greater than 20	.05 - .07	5.6 - 6.0	Low	Moderate
224C2 224D2 224E2 224E3 224F2 224F3	Strawn silt loam		Greater than 3 feet	0-8	Silty clay loam	CL	A-6 or A-7	100	100	95-100	.6 - 2.0	.18 - .20	6.6 - 7.3	Moderate	--
				8-19	Clay loam	CL	A-6 or A-7	100	100	70-80	.6 - 2.0	.15 - .19	6.6 - 7.3	Moderate	Moderate
				19-60	Loam	ML or CL	A-4 or A-6	100	100	60-75	.6 - 2.0	.17 - .19	7.9 - 8.4 Calcareous	Low to mod.	Low
19E3 19F2 19F3 19G2 19G3	Sylvan silt loam		Greater than 3 feet	0-14	Silty clay loam	CL	A-6 or A-7	100	100	95-100	.6 - 2.0	.18 - .20	6.1 - 7.3	Moderate	--
				14-60	Silt loam	ML or CL	A-4 or A-6	100	100	95-100	.6 - 2.0	.20 - .22	7.4 - 8.4 Calcareous	Low to mod.	Low

36A 36B 36B2 36C 36C2 36C3 36D 36D2 36D3 36E2 36E3	Tama silt loam		Greater than 2½ feet	0-23 23-53 53-60	Silt loam Silty clay loam Silt loam	CL or ML CL CL	A-7 or A-6 A-7 or A-6 A-6	100 100 100	100 100 100	95-100 95-100 95-100	.6 - 2.0 .6 - 2.0 .6 - 2.0	.22 - .24 .18 - .20 .20 - .22	5.1 - 6.5 5.1 - 5.5 5.6 - 6.0	Moderate Moderate Moderate	-- Moderate Moderate
565B 565C 565C2 565D 565D2 565D3 565E2 565E3 565F2 565F3 952 or ZC 952 or ZC2 952 or ZD2 952 or ZD3 952 or ZE2 952 or ZE3 952 or ZF 952 or ZF2 952 or ZF4	Tell silt loam. In areas of 952 or Z symbol occurs as undifferentiated units with Lamont series. See Lamont also.		Greater than 3 feet	0-27 27-31 31-60	Silt loam Loam Loamy sand	ML or CL ML or CL SM	A-4 or A-6 A-4 or A-6 A-2	100 100 100	100 100 100	95-100 60-75 15-30	.6 - 2.0 .6 - 2.0 6.0 -20.0	.22 - .24 .17 - .19 .08 - .10	5.1 - 6.0 5.1 - 5.5 5.6 - 6.0	Low to mod. Low to mod. Low	Moderate Low Moderate
577D 577E 577F	Terrace Escarpments		Greater than 2 feet	0-60	Stratified material mostly silty clay and clay	CH	A-7	100	100	75-95	Less than .06	.08 - .14	5.1 - 8.4	High	Low
271E2 271F2 271G2	Timula silt loam		Greater than 3 feet	0-60	Silt loam	ML	A-4	100	100	95-100	.6 - 2.0	.20 - .24	6.6 - 8.4 Calcareous	Low	Low
333	Wakeland silt loam		1 to 2½ feet	0-40 40-60	Silt loam Silt loam	ML or CL ML or CL	A-4 or A-6 A-4 or A-6	100 100	100 100	70-90 70-90	.6 - 2.0 .6 - 2.0	.20 - .24 .20 - .22	6.6 - 7.3 7.4 - 7.8	Low Low to mod.	Low Low
564B 564C 564C2 564D2 564E2	Waukegan silt loam		Greater than 3 feet	0-8 8-28 28-34 34-60	Silt loam Silt loam Sandy loam Loamy sand	ML or CL ML or CL SM SM	A-4 or A-6 A-4 or A-6 A-2 or A-4 A-2	100 100 100 100	100 100 100 100	95-100 95-100 30-40 15-30	.6 - 2.0 .6 - 2.0 2.0 - 6.0 6.0 -20.0	.22 - .24 .20 - .22 .12 - .14 .08 - .10	6.6 - 7.3 5.1 - 6.5 5.6 - 6.0 6.1 - 7.3	Low to mod. Low to mod. Low Low	-- Moderate Moderate Low
951 or YC 951 or YC2 951 or YD 951 or YD2 951 or YD3 951 or YE 951 or YE2 951 or YE3 951 or YF 951 or YF2 951 or YF3 951 or YG2 951 or YG3	Woodbine silt loam. Mapped only as undifferentiated units with Palsgrove series. See Palsgrove also.	3 to 5 feet to limestone	Greater than 3 feet	0-15 15-30 30-45 45-50 50-60	Silt loam Silty clay loam Clay loam Silty clay Limestone bedrock	ML or CL CL CL CH --	A-4 or A-6 A-6 or A-7 A-6 or A-7 A-7 --	100 100 100 100 --	100 100 100 100 --	95-100 85-95 70-95 90-95 --	.6 - 2.0 .6 - 2.0 .6 - 2.0 .06- .6 Variable	.22 - .24 .18 - .20 .14 - .16 .10 - .12 --	5.6 - 7.3 5.6 - 6.0 5.1 - 6.0 6.6 - 7.3 Calcareous	Low to mod. Mod. to high Moderate Moderate --	-- Moderate Moderate Low --
37A 37B 37C 37D2	Worthen silt loam		Greater than 2½ feet	0-60	Silt loam	ML or CL	A-6	100	100	70-90	.6 - 2.0	.20 - .24	5.6 - 6.5	Moderate	Low
576A 576B 576C	Zwingle silt loam		1 to 2½ feet	0-16 16-30 30-55 55-60	Silt loam Silty clay loam Silty clay Loam	CL or ML CL CH ML or CL	A-6 or A-4 A-6 A-7 A-4 or A-6	100 100 100 100	100 100 100 100	95-100 95-100 90-95 60-75	.2 - 2.0 .2 - .6 Less than .06 .2 - 2.0	.20 - .22 .14 - .16 .09 - .11 .17 - .19	6.6 - 7.3 6.1 - 6.5 5.1 - 5.5 5.6 - 6.0	Moderate Moderate High Low to mod.	-- Low Moderate Low

[a] Root penetration may be restricted in some layers so that plants may not be able to use all the available water indicated.

[b] Corrosivity potential is estimated only for those depths or layers where conduits are likely to be buried.

[c] Organic materials (muck) are subject to extremely high volume changes due to compressibility and subsidence when drained.

Column 14. The "Reaction" column lists estimated ranges in field pH values for each major soil horizon. These ranges are defined as very strongly acid, 4.5 to 5.0; strongly acid, 5.1 to 5.5; medium acid, 5.6 to 6.0; slightly acid, 6.1 to 6.5; neutral, 6.6 to 7.3; mildly alkaline, 7.4 to 7.8 (calcareous); moderately alkaline, 7.9 to 8.4 (calcareous); strongly alkaline, 8.5 to 9.0 (calcareous); and very strongly alkaline, above 9.0 (calcareous). A pH of 7 is neutral, lower values indicate acidity, and higher values express alkalinity.

Column 15. The "Shrink-swell potential" column rates each major soil layer as low, moderate, or high. Shrink-swell potential is that quality of the soil that determines its change in volume with change in moisture content. The amount and type of clay in a soil as well as the organic matter content determine to a great extent the shrink-swell potential for a particular soil layer. Other factors that affect the shrink-swell potential of soil material for engineering construction are initial moisture content, dry density, degree of compaction, and amount of confining pressure.

Column 16. The "Corrosivity potential" column rates each major soil layer as low, moderate, or high. Corrosivity is given in relation to concrete conduits for the major soil layers in which the conduits would likely be placed. Where soil properties place the soil in more than one rating, or indicate a range in rating, the most severe rating is used. Because of the many variables involved, these ratings serve only as a general guide.

INTERPRETATIONS OF ENGINEERING PROPERTIES

Table 9 gives engineering interpretations of Carroll County soils with respect to suitability as sources of construction material and to soil features that affect suitability for engineering practices.

Column 1. The soil name includes the series name and dominant surface texture or, in the case of land types, the appropriate descriptive name. The map symbols refer to those found on the map sheets at the back of the report.

Column 2. The "Topsoil" column rates the surface and subsoil layers as good, fair, poor, or very poor as a source of topsoil. Topsoil refers to soil material that is used to top-dress areas such as roadbanks, lawns, gardens, and dams. The ratings are based upon the relative amount of organic matter, available moisture capacity, ease of working the soil, and natural high lime content. Surface layers were not rated for soils that occur only as moderately or severely eroded. The qualifying statements following the ratings refer to the soils' shortcomings rather than their merits. Soils rated good would have few if any limitations. Soils rated less than good could be expected to be limited by such factors as low organic matter content, low available water capacity, unfavorable tilth, or hazard of excavation because of frequent high water table.

Column 3. The "Sand or gravel" column gives qualifying statements about the soils' suitability as a source of sand, gravel, or crushed limestone. A "not suitable" notation is listed for soils where sand and gravel are not expected within 60 inches. Soils considered as a source of sand or gravel will in some places require exploring to find material that meets engineering specifications.

Column 4. The "Highway subgrade material" column rates the subsoil and substrata as a source of road fill. Ratings are based on the performance of the soil material when excavated and used as borrow for highway subgrade. The AASHO Classification System was used to make the general ratings: A-1, very good; A-2, good to fair depending on the characteristics of the soil binder; A-3, good if soil binder is added; A-4, fair; A-6, poor; A-7, very poor. The most desirable soil material is gravel or gravel mixed with a moderate amount of sand; it is affected the least by adverse weather conditions and can be worked during a greater number of months of the year. The least desirable materials are clays or organic materials. The major soil features considered in evaluating the soils for subgrade are shear strength, compressibility, workability, shrink-swell potential, bearing capacity, and compaction characteristics. Other factors considered are stability, erosiveness, depth to water table, moisture content, and presence of stones or boulders.

Column 5. The "Highway location" column lists soil features affecting suitability for location of highways. The factors considered are those features and qualities of the soil in place that affect the overall performance of the soil for the geographic location of a highway route. The entire soil profile is evaluated, based on an undisturbed soil without artificial drainage. It is assumed that the surface soil, because of its higher organic matter content, is removed in construction and used for topsoil. The major soil factors considered in evaluating the soils for highway location in Carroll County refer only to soil features that are applicable to the specific soil. Those overall features considered were presence and thickness of organic material, depth to bedrock, high water table frequency, degree of susceptibility to frost heave, erodibility of unvegetative slopes, flooding or ponding hazard, topography, ease of excavation and vegetation, traction of road equipment, hazards of very steep slopes, likelihood of seepage in cuts, and plasticity of the material.

Column 6. The "Foundations for low buildings" column rates the soil zone that provides the base for supporting foundations of low buildings less than three stories high. Normally, the zone to be rated lies below the frostline or below 2½ to 3 feet. Where the entire solum does not extend below 2½ to 3 feet, only the substratum is rated. Some sola extend below 4 or 5 feet; substrata lying at greater depths are not rated. In some soils foundations are placed in lower

solum material and in substrata, and ratings were made for both. General suitability ratings, based on the Unified Classification System, were evaluated as slight, moderate, or severe, depending on the soil bearing capacity, shrink-swell potential, and shear strength. Qualifying ratings for each feature are indicated. Frequency of high water table is stated for applicable soils. Depth range to bedrock is given for soils where limestone or residuum lies at less than 5 feet.

Column 7. The "Sewage lagoon disposal systems" column rates the soil as having slight, moderate, or severe limitations for lagoons. Soil features or properties are stated that place the soil into one of the three different rating limitations. The major characteristics used to determine the rating limitations are permeability and land slope. Depth range to bedrock, organic matter percentage, and flooding or ponding hazard are mentioned for applicable soils. Statements concerning contamination of nearby water supplies are made for appropriate soils.

Column 8. The "Septic tank sewage disposal systems" column rates the soil as having slight, moderate, or severe limitations for septic tank filter fields. Soil features or properties are stated that place the soil into one of the three different rating limitations. The major characteristics used to determine the rating limitations are permeability and land slope. Depth range to bedrock, high water table frequency, and flooding or ponding hazard are mentioned for applicable soils. Statements concerning pollution and effluent seepage on slopes are made for appropriate soils.

Column 9. The "Reservoir area" column indicates those features and qualities of undisturbed soils that affect their suitability for water impoundments or reservoirs for farm ponds. Important factors affecting the seepage rate are permeability, expressed in terms of seepage, and depth to bedrock or other unfavorable material. A soil having a permeability rate of 2.0 to 6.0 inches per hour is expected to have a moderately rapid seepage rate; a soil having 0.06 to 0.2 inch per hour permeability rate is expected to have a slow seepage rate. High water table frequency is mentioned for soils that have poor or somewhat poor internal drainage. Seepage rates for dug ponds are given for those soils that are nearly level.

Column 10. The "Embankments" column evaluates those features and qualities of disturbed soils that affect their suitability for constructing farm pond embankments. Evaluations for sola below the surface layer and substrata were made where the soil characteristics are contrasting and have significant thickness for use as borrow. Substrata were not evaluated where sola commonly extend below 5 feet. Sola below the surface layer and substrata that were not significantly contrasting were evaluated collectively. The Unified Classification System was used for evaluating the soils in terms of their compacted seepage rate, stability, compaction character, resistance to piping, and shrink-swell potential. Evaluations were not made for materials that have a high seepage rate even when compacted.

Column 11. The "Agricultural drainage" column states those features and qualities of the soil that affect the installation and performance of surface and subsurface drainage practices. The major soil features considered as affecting drainage for poorly and somewhat poorly drained soils are high water table frequency and permeability. Depth to bedrock and flooding are mentioned for applicable soils. General feasibility for tiling or surface drainage, based on soil characteristics, is given in terms of the soil's response to those practices. Operational drainage systems are entirely dependent upon adequate outlets. Soils normally occupying flood plains are considered as having adequate outlets. General feasibility for tiling or surface drainage for upland and terrace soils is qualified as to outlet availability. Moderately well and well internally drained soils are considered to have adequate natural drainage.

Column 12. The "Irrigation" column evaluates or indicates those features or qualities of the soil that affect its suitability for irrigation. The major soil features considered are water-intake rate (rapid, medium, or slow, depending on the soil's overall texture) and available water capacity (low, moderate, or high, based on the soil's measured or estimated ability to retain water). Depth of soil, as affecting root penetration; susceptibility to water and wind erosion; frequency of high water table, as an indication of the need for drainage; susceptibility to stream overflow; and the soil's natural high lime content are mentioned for applicable soils. Topography is not listed as a considered factor in the "Irrigation" column, but Column 1, "Soil series and map symbol," gives an indication of topography by the slope letter following the soil name number. Topography is a more important factor for a gravitational system than for sprinkler irrigation.

Column 13. The "Terraces and diversions" column states those features and qualities of the soils that affect their suitability for terraces and diversions. The main soil features considered in establishing terraces and diversions as applicable to each soil are depth to bedrock or other unfavorable material, steepness and uniformity of slope, and texture and organic matter content as related to ease of working less favorable exposed material. Less prevalent features such as potential of channel accumulation from wind erosion, susceptibility of wet channels, and presence of boulders, stones, and chert are given consideration where appropriate. Soils having rapid infiltration and permeability are not considered as having a water erosion hazard, and interpretations for terraces and diversions are not given for them. In most places ter-

TABLE 9. — INTERPRETATIONS OF ENGINEERING

Soil series and map symbol	Suitability as a source of			Soil features affecting suitability for engineering practices		
	Topsoil	Sand or gravel	Highway subgrade material	Highway location	Foundations for low buildings	Sewage lagoon disposal systems
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Ade loamy fine sand (98A, 98B, 98C, 98D)	Surface and underlying material are poor — low available water capacity.	Good for sand; material too small for gravel.	Good to about 3 feet; good to fair to below 5 feet.	Unvegetated areas subject to severe wind erosion; loose sand hinders traction of road equipment; low susceptibility to frost heave; nearly level to rolling topography.	Slight limitations — bearing capacity is good; shrink-swell potential is low; shear strength is good to fair.	Severe limitations — rapid permeability and danger of contamination; slopes range from 0 to 12 percent.
Argyle silt loam (227B, 227C, 227C2, 227D2, 227E2)	Surface is good. Eroded slopes are fair. Subsoil is poor — subsoil material is low in organic matter and difficult to work.	Not suitable above 5 feet in most places; mixed sand and gravel lies below 5 feet in some areas.	Subsoil is poor to very poor to below 5 feet.	Moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; gently undulating to strongly rolling topography; plastic subsoil material.	Moderate limitations in the subsoil — fair bearing capacity; moderate shrink-swell potential; fair shear strength.	Moderate limitations — moderate permeability. Severe limitations on slopes greater than 7 percent.
Ashdale silt loam (411B, 411C2, 411D2, 411E3)	Surface is good. Eroded slopes are fair to poor. Subsoil is poor — subsoil material is low in organic matter and difficult to work.	Not suitable for sand or gravel; possible source of limestone for crushing below 3 to 5 feet.	Subsoil is very poor; substratum is limestone bedrock, very good when crushed.	3 to 5 feet to limestone bedrock or residuum; moderate to high susceptibility to frost heave above the bedrock; unvegetated slopes highly erosive; gently sloping to moderately steep topography; some cuts will expose limestone bedrock difficult to vegetate; excavation below 3 to 5 feet will be difficult; plastic subsoil material.	Severe limitations in the subsoil — fair bearing capacity; moderate to high shrink-swell potential; fair to poor shear strength. Limestone bedrock lies at 3 to 5 feet.	Severe limitations — moderate permeability, but bedrock lies at 3 to 5 feet; some slopes greater than 7 percent; contamination through the limestone crevices is a hazard.
Atterberry silt loam (61A, 61B)	Surface is good. Subsoil is poor — low in organic matter; difficult to work.	Not suitable.	Subsoil is very poor to poor; substratum is fair to poor.	Occasional high water table; moderate to high susceptibility to frost heave; nearly level to gently undulating topography; plastic subsoil material.	Moderate limitations in the subsoil — fair bearing capacity; moderate shrink-swell potential; fair shear strength. Moderate limitations in the substratum — fair to poor bearing capacity; low to moderate shrink-swell potential; fair to poor shear strength. Occasional high water table.	Moderate limitations — moderate permeability; slopes range from 0 to 4 percent.
Bloomfield fine sand (53B, 53D, 53F)	Surface and underlying material are very poor — low available water capacity and organic matter.	Good for sand; material too small for gravel.	Good to about 3 feet; good to fair to below 5 feet.	Low susceptibility to frost heave; unvegetated areas subject to severe wind erosion; gently undulating to steep topography; loose sand hinders traction of road machinery.	Slight limitations — good bearing capacity; low shrink-swell potential; fair shear strength.	Severe limitations — rapid permeability; danger of contamination; slopes range from 2 to 30 percent.
Blown-Out Land (63)	Material very poor — low available water capacity and organic matter.	Good for sand; material too small for gravel.	Good — all features favorable.	Low susceptibility to frost heave; sand material difficult to vegetate and subject to severe wind erosion. Undulating to very steep "pockmarked" topography; loose sand hinders traction of road machinery.	Slight limitations — good bearing strength; low shrink-swell potential; good shear strength.	Severe limitations — rapid permeability and landscape is very irregular. Danger of contamination.
Camden silt loam (134A, 134B, 134C, 134C2, 134D2, 134E2)	Surface is good. Subsoil and eroded slopes are poor — low in organic matter; subsoil material difficult to work.	Not suitable above 5 feet. Stratified layers of gravel, sand, and other materials lie below 5 feet in some places.	Subsoil is poor to very poor; substratum is good to very poor.	Moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; gently undulating to strongly rolling topography; plastic subsoil material.	Moderate limitations in the subsoil — fair bearing capacity; moderate shrink-swell potential; fair shear strength. Slight to severe limitations in the substratum depending on the texture of the strata.	Moderate limitations — moderate permeability. Severe limitations on slopes greater than 7 percent.
Casco silt loam Mapped only in complexes with the Fox series. See also Fox. (972D2 or XD2, 972E2 or XE2, 972E3 or XE3)	Subsoil and eroded slopes are poor — low in organic matter; subsoil material difficult to work; gravel and stones likely.	Good for gravel; about 2 feet or less of overburden in most places.	Subsoil is poor to very poor; substratum is very good.	Large stones and boulders in some places; moderate to high susceptibility to frost action in upper 1 to 2 feet; unvegetated slopes highly erosive; topography rolling to strongly rolling; cuts expose gravel difficult to vegetate; large boulders and stones hinder excavation.	Slight limitations in the gravelly substratum — good bearing capacity; low shrink-swell potential; good shear strength; excavation will be difficult in some places.	Severe limitations — moderately rapid or moderate permeability; all slopes greater than 7 percent; danger of contamination through the underlying gravel.

PROPERTIES OF SOILS IN CARROLL COUNTY, ILLINOIS

Soil features affecting suitability for engineering practices							
Septic tank sewage disposal systems (8)	Farm ponds: Reservoir area (9)	Farm ponds: Embankments (10)	Agricultural drainage (11)	Irrigation (12)	Terraces and diversions (13)	Grassed waterways (14)
Rapid permeability — slight limitations where there is no pollution hazard. Moderate limitations on 4- to 12-percent slopes.	Rapid seepage rate; material too porous to hold water.	Sandy material — rapid seepage rate even when compacted.	Soil is somewhat excessively drained; natural drainage is adequate.	Rapid water-intake rate; low available water capacity; susceptible to wind erosion.	Rapid infiltration and permeability; water erosion not a hazard in most places — terraces not needed.	Well-drained sandy material; low available water capacity; difficult to establish and maintain vegetation; subject to accumulation from wind erosion.
Slight limitations — moderate permeability. Moderate limitations on 4- to 12-percent slopes. Severe limitations on slopes greater than 12 percent.	Moderate seepage rate.	Silty clay loam and gravelly clay loam subsoil — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential.	Soil is moderately well and well drained; natural drainage is adequate.	Medium water-intake rate; high available water capacity; slopes susceptible to severe water erosion.	Soil features favorable for construction except some slopes exceed 12 percent or are irregular. Exposed silty clay loam or clay loam subsoil has less favorable tilth and low organic matter content.	Soil features favorable for construction. Some cuts expose silty clay loam or clay loam subsoil, causing difficult seedbed preparation.
Severe limitations — moderate permeability, but bedrock lies at 3 to 5 feet; some slopes greater than 12 percent; danger of pollution through the limestone crevices.	Moderate seepage rate in silty material; limestone bedrock lies at 3 to 5 feet; water is lost as it seeps along fractures of the bedrock.	Predominantly silty clay loam subsoil — low seepage rate when compacted; fair stability and compaction character; good resistance to piping; moderate to high shrink-swell potential. Substratum is dense limestone bedrock — impractical to excavate for fill material in most places.	Soil is well drained; natural drainage is adequate.	Most favorable rooting area limited to the 3 to 5 feet above the limestone bedrock. Overlying silty material has a medium water-intake rate and moderate to high available water capacity; slopes susceptible to severe water erosion.	Soil features favorable for construction of conventional terraces except some slopes exceed 12 percent or are irregular. Cuts for parallel terraces expose limestone bedrock in some places. Exposed silty clay loam subsoil has less favorable tilth and low organic matter content.	Soil features favorable for construction. Some cuts expose silty clay loam subsoil, causing difficult seedbed preparation.
Moderate limitations — moderate permeability, but occasional high water table.	Moderate seepage rate; occasional high water table; compacted dug ponds have low seepage rate if subsoil material is used to blanket the bottom of the impoundment area.	Silty clay loam subsoil — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential. Silt loam substratum — low to moderate seepage rate when compacted; fair to poor stability and compaction character; good to poor resistance to piping; low to moderate shrink-swell potential.	Occasional high water table; moderate permeability; tile functions satisfactorily in most places if outlets are obtained.	Medium water-intake rate; very high available water capacity; occasional high water table.	Erosion not a hazard in most places — terraces not needed. Soil features favorable for constructing diversions to accommodate nearby hill water.	Nearly level to gently sloping topography — waterways not needed in most places. Soil features favorable for constructing surface ditches to accommodate water from nearby grassed waterways.
Rapid permeability — slight limitations where there is no pollution hazard. Moderate limitations on 4- to 12-percent slopes. Severe limitations on slopes greater than 12 percent.	Rapid seepage rate; too porous to hold water.	Sandy material — rapid seepage rate even when compacted.	Soil is well to somewhat excessively drained; natural drainage is adequate.	Rapid water-intake rate; low available water capacity; susceptible to severe wind erosion.	Infiltration and permeability are rapid; water erosion not a hazard in most places — terraces not needed.	Well-drained sandy material; low available water capacity; difficult to establish and maintain vegetation; subject to accumulation from wind erosion.
Rapid permeability — pollution hazard in some places. Severe limitations caused by "pockmarked" landscape.	Rapid seepage rate; too porous to hold water.	Sandy material — rapid seepage rate even when compacted.	Soil is excessively drained; natural drainage is adequate.	Rapid water-intake rate; low available water capacity; undulating to very steep "pockmarked" topography; susceptible to severe wind erosion.	Infiltration and permeability are rapid; water erosion not a hazard in most places.	Well-drained sandy material; low available water capacity; difficult to establish and maintain vegetation; subject to accumulation from wind erosion; topography very irregular.
Slight limitations — moderate permeability. Moderate limitations on 4- to 12-percent slopes. Severe limitations on slopes greater than 12 percent.	Moderate seepage rate.	Predominantly silty clay loam subsoil — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential. Predominantly sandy loam substratum — moderate seepage rate when compacted; fair stability and compaction character; poor resistance to piping; low shrink-swell potential.	Soil is moderately well and well drained — natural drainage is adequate.	Medium water-intake rate; high available water capacity; slopes susceptible to severe water erosion.	Soil features favorable for construction except some slopes exceed 12 percent or are irregular. Exposed silty clay loam subsoil has less favorable tilth and low organic matter content.	Soil features favorable for construction. Some cuts expose silty clay loam subsoil, causing difficult seedbed preparation.
Moderately rapid or moderate permeability; moderate limitations on 7- to 12-percent slopes. Severe limitations on slopes over 12 percent. Pollution is a hazard through the underlying gravel.	Moderately rapid seepage rate in upper 1 to 2 feet; underlying gravel permits rapid seepage.	Subsoil layer too thin in most places to use as borrow. Substratum is mostly loamy gravel — rapid seepage rate even when compacted.	Soil is well to somewhat excessively drained; natural drainage is adequate.	Most favorable rooting area limited to the 1 to 2 feet above the calcareous gravel. Overlying material has a medium water-intake rate and low available water capacity; slopes susceptible to severe water erosion.	1 to 2 feet to calcareous gravel; gravel and stones likely; some slopes exceed 12 percent; in most places construction exposes gravel difficult to work and vegetate.	Shallow, well-drained to somewhat excessively drained silty or loamy material over calcareous gravel; low available water capacity; gravel and stones likely; in some places construction exposes gravel difficult to work and vegetate.

TABLE 9 (cont.). — INTERPRETATIONS OF ENGINEERING

Soil series and map symbol	Suitability as a source of			Soil features affecting suitability for engineering practices		
	Topsoil	Sand or gravel	Highway sub-grade material	Highway location	Foundations for low buildings	Sewage lagoon disposal systems
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Chute fine sand (282E3, 282F3)	Sand material is very poor — low available water capacity and organic matter.	Good for sand; material too small for gravel.	Good — all features favorable.	Low susceptibility to frost heave; sand material difficult to vegetate and subject to severe wind erosion; strongly rolling to steep topography; loose sand hinders traction of road equipment.	Slight limitations — good bearing strength; low shrink-swell potential; good to fair shear strength.	Severe limitations — rapid permeability, slopes greater than 7 percent. Danger of contamination.
Coatsburg silt loam (660D2, 660D3, 660E2, 660E3)	Eroded slopes are fair to poor. Subsoil is poor — subsoil material is low in organic matter and difficult to work.	Not suitable.	Subsoil is very poor to poor; substratum is fair to poor.	Occasional high water table; moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; topography strongly sloping to moderately steep; seepage likely in cuts; highly plastic subsoil.	Severe limitations in the subsoil — fair bearing capacity; high to moderate shrink-swell potential; poor shear strength. Moderate limitations in the substratum — fair to poor bearing capacity; moderate to low shrink-swell potential; fair to poor shear strength. Occasional high water table.	Slow to very slow permeability but severe limitations because slopes are greater than 7 percent.
Derinda silt loam Mapped only in undifferentiated units with the Eleroy series. See also Eleroy. (949C2, 949D2, 949D3, 949E2, 949E3, 949F2)	Subsoil and eroded slopes are poor — low in organic matter; subsoil is clayey and difficult to work.	Not suitable; clay shale occurs at about 1 to 2½ feet.	Subsoil and substratum are very poor.	1 to 2½ feet to shale material; high susceptibility to frost heave; unvegetated slopes highly erosive; moderately sloping to steep topography; seepy areas likely in cuts; most cuts expose shale material difficult to vegetate; subsoil and substratum are highly plastic.	Severe limitations in the subsoil and substratum — fair bearing capacity; high shrink-swell potential; poor to fair shear strength.	Severe limitations — slow permeability, but most slopes greater than 7 percent.
Dickinson sandy loam (87A, 87B, 87C, 87C2, 87E2)	Surface is good. Eroded slopes are fair. Subsoil is poor — low in organic matter and somewhat droughty.	Good for sand; material too small for gravel; less than 3½ feet to loose sand.	Subsoil is good to fair; substratum is very good to good.	Low to moderate susceptibility to frost heave; unvegetated areas subject to water and wind erosion; nearly level to strongly rolling topography; cuts expose drouthy sand difficult to vegetate.	Slight limitations in subsoil and substratum — good bearing capacity; low shrink-swell potential; good to fair shear strength.	Severe limitations — moderately rapid to rapid permeability and danger of contamination; slopes range from 0 to 18 percent.
Dorchester silt loam (239A, $\overline{239A}$, 239B)	Good to below 5 feet but material has high lime content.	Not suitable in most places.	Fair to poor.	Occasional high water table; moderate to high susceptibility to frost heave; topography depressional to gently undulating; subject to occasional flooding or ponding.	Moderate limitations — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength. Occasional high water table.	Moderate limitations — moderate permeability. Subject to occasional flooding and ponding.
Dorchester silt loam, cobbly subsoil variant (578)	Good to about 2½ feet but material has high lime content; underlying coarse material is unsuitable.	Possible source of mixed gravel, chert, and limestone fragments; about 2 to 3 feet of overburden in most places.	Fair to poor from about 2 to 3 feet; substratum is very good.	Occasional high water table; moderate to high susceptibility to frost heave in upper 2 to 3 feet; topography nearly level; limestone fragments and stones hinder excavation below 2 to 3 feet; subject to occasional flooding.	Moderate limitations — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength. Slight limitations in the rocky substratum except excavation will be difficult below 2 to 3 feet. Occasional high water table.	Severe limitations — moderate permeability in upper 2 to 3 feet, but coarse material below is rapidly permeable. Subject to occasional flooding.
Downs silt loam (386A, 386B, 386C, 386C2, 386D, 386D2, 386E, 386E2)	Surface is good. Eroded slopes are fair. Subsoil is poor — subsoil material is low in organic matter and difficult to work.	Not suitable.	Subsoil is poor to very poor; substratum is fair to poor.	Moderate to high susceptibility to frost heave; topography nearly level to moderately steep; unvegetated slopes highly erosive; plastic subsoil material.	Moderate limitations in the subsoil — fair bearing capacity; moderate shrink-swell potential; fair shear strength. Moderate limitations in the substratum — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength.	Moderate limitations — moderate permeability. Severe limitations on slopes greater than 7 percent.

PROPERTIES OF SOILS IN CARROLL COUNTY, ILLINOIS

Soil features affecting suitability for engineering practices						
Septic tank sewage disposal systems	Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Grassed waterways
	Reservoir area	Embankments				
(8)	(9)	(10)	(11)	(12)	(13)	(14)
Rapid permeability — pollution hazard in some places. Severe limitations on slopes greater than 12 percent.	Rapid seepage rate; too porous to hold water.	Sandy material — rapid seepage rate even when compacted.	Soil is excessively drained; natural drainage is adequate.	High lime content; rapid water-intake rate; low available water capacity; susceptible to severe wind erosion.	Rapid infiltration and permeability; water erosion not a hazard in most places.	Well-drained calcareous sandy material; low available water capacity; difficult to establish and maintain vegetation; subject to accumulation from wind erosion.
Severe limitations — slow to very slow permeability and occasional high water table; slopes range from 7 to 18 percent; effluent seepage on slopes likely.	Slow seepage rate; occasional high water table.	Clayey subsoil material commonly extends below 5 feet — low seepage rate when compacted; fair stability and compaction character; good resistance to piping; high to moderate shrink-swell potential.	Occasional high water table; slow to very slow permeability; slopes range from 7 to 18 percent. Specially designed drainage systems will be needed in most places.	Slow water-intake rate; clayey subsoil; moderate available water capacity; occasional high water table; slopes highly susceptible to severe water erosion.	Less than 2 feet to silty clay or clay subsoil; some slopes exceed 12 percent: construction exposes clayey subsoil difficult to work and low in organic matter content; most channels will remain wet for long periods after rains.	Poorly drained clayey subsoil material; moderate available water capacity; in most places construction exposes clayey subsoil difficult to work and vegetate; some waterways remain wet for long periods after rains.
Severe limitations — slow permeability; soil material is mostly fine textured and plastic; effluent seepage on slopes likely.	Slow seepage rate in about upper 1 to 2½ feet; very slowly permeable clay shale lies at 1 to 2½ feet.	Silty clay loam to silty clay subsoil, silty clay to clay shale substratum — low seepage rate when compacted; fair to poor stability and compaction character; good resistance to piping; high shrink-swell potential.	Soil is moderately well and well drained; natural drainage is adequate in most places.	Most favorable rooting area is limited to the 1 to 2½ feet above the shale bedrock. Overlying material has a slow water-intake rate and low to moderate available water capacity; slopes susceptible to severe water erosion.	1 to 2½ feet to clay shale; some slopes exceed 12 percent; construction exposes clay shale difficult to work and vegetate.	Shallow, moderately well- and well-drained clayey material over shale bedrock; low to moderate available water capacity; construction exposes clay shale difficult to work and vegetate.
Moderately rapid to rapid permeability — slight limitations where there is no pollution hazard. Moderate limitations on 4- to 12-percent slopes. Severe limitations on slopes greater than 12 percent.	Moderately rapid seepage rate.	Sandy loam material — moderate to low seepage rate when compacted; fair stability and fair to good compaction character; poor to good resistance to piping; low shrink-swell potential. Substratum is sand — rapid seepage rate even when compacted.	Soil is well to somewhat excessively drained; natural drainage is adequate.	Most favorable rooting area is limited to the 2 to 3 feet above the loose sand. Overlying sandy loam material has a rapid water-intake rate and low available water capacity; susceptible to wind and water erosion.	Moderately rapid to rapid permeability — water erosion not a severe hazard. 2 to 3 feet to loose sand; some slopes exceed 12 percent; deep cuts expose loose sand difficult to vegetate; channels subject to accumulation from wind erosion.	Shallow, well-drained to somewhat excessively drained sandy loam material over loose sand; low available water capacity; in some places construction exposes loose sand difficult to vegetate; subject to accumulation from wind erosion.
Moderate limitations — moderate permeability; occasional high water table; severe limitations where occasional flooding and ponding are a hazard.	Moderate seepage rate; occasional high water table; dug ponds have moderate seepage even after compaction.	Silty material — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential.	Occasional high water table; moderate permeability; tile functions satisfactorily; subject to stream overflow.	High lime content; medium water-intake rate; very high available water capacity; occasional high water table; susceptible to stream overflow.	Nearly level topography — terraces not needed. Soil features favorable for constructing diversions to accommodate nearby hill water.	Nearly level topography — waterways not needed. Soil features favorable for constructing surface ditches to accommodate water from nearby grassed waterways.
Moderate limitations — occasional high water table; moderate permeability above 2 to 3 feet; rapid permeability in coarse material below; pollution is a hazard in some places. Severe limitations where occasional ponding and flooding are a hazard.	Moderate seepage rate in upper 2 to 3 feet; underlying cobbly material permits rapid seepage; occasional high water table.	Silty material — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential. Substratum is mostly cobbly material — rapid seepage rate even when compacted.	Occasional high water table; moderate permeability in silty material; rapid permeability in rocky substratum; cobbly material hinders installation of tile in most places; subject to stream overflow.	High lime content; most favorable rooting area is limited to the 2 to 3 feet above the cobbly substratum. Overlying silty material has a medium water-intake rate and moderate to high available water capacity; occasional high water table; susceptible to stream overflow.	Nearly level topography — terraces not needed. Construction of diversions to accommodate nearby hill water will expose cobbly material in some places.	Nearly level topography — waterways not needed. Excavation for surface ditches to accommodate nearby grassed waterways will expose cobbly material in some places.
Slight limitations — moderate permeability. Moderate limitations on 4- to 12-percent slopes. Severe limitations on slopes greater than 12 percent.	Moderate seepage rate.	Silty clay loam subsoil — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential. Silt loam substratum — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential.	Soil is moderately well and well drained; natural drainage is adequate.	Medium water-intake rate; very high available water capacity; slopes susceptible to severe water erosion.	Soil features favorable for construction except some slopes exceed 12 percent or are irregular. Exposed silty clay loam subsoil has less favorable tilth and low organic matter content.	Soil features favorable for construction. Some cuts expose silty clay loam subsoil, causing difficult seedbed preparation.

TABLE 9 (cont.). — INTERPRETATIONS OF ENGINEERING

Soil series and map symbol	Suitability as a source of			Soil features affecting suitability for engineering practices		
	Topsoil	Sand or gravel	Highway subgrade material	Highway location	Foundations for low buildings	Sewage lagoon disposal systems
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Drummer silty clay loam (152)	Surface is fair. Subsoil is poor — clayey; frequent high water table.	Not suitable above 5 feet. Gravelly material below 5 feet in some places.	Subsoil is very poor to poor; substratum is fair to poor.	Water table frequently high; moderate to high susceptibility to frost heave; topography depressional to nearly level; plastic surface and subsoil.	Severe limitations in the subsoil — fair bearing capacity; moderate to high shrink-swell potential; fair to poor shear strength. Moderate limitations in the substratum — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength; frequent high water table.	Moderate limitations — moderate permeability.
Drury silt loam (75B, 75C, 75C2, 75D2, 75E2, 75F2)	Surface is good. Subsoil and eroded slopes are fair — low in organic matter.	Not suitable.	Fair to poor.	Moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; topography gently sloping to steep.	Moderate limitations — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength.	Moderate limitations — moderate permeability. Severe limitations on slopes greater than 7 percent.
Dubuque silt loam Mapped only in undifferentiated units with the Palsgrove series. See also Palsgrove. (950C, 950C2, 950D, 950D2, 950D3, 950E, 950E2, 950E3, 950F, 950F2, 950F3, 950G, 950G2)	Surface is good. Subsoil and eroded slopes are poor — low in organic matter; subsoil material difficult to work.	Not suitable for sand or gravel; possible source of limestone for crushing below 1½ to 3 feet.	Subsoil is poor to very poor; substratum is limestone bedrock, very good when crushed.	1½ to 3 feet to limestone bedrock or residuum; moderate to high susceptibility to frost heave above the bedrock; unvegetated slopes highly erosive; topography strongly sloping to very steep; cuts will expose limestone bedrock difficult to vegetate; use of power machinery hazardous on very steep slopes; excavation will be difficult; highly plastic subsoil.	Severe limitations in the subsoil — fair bearing capacity; moderate to high shrink-swell potential; fair to poor shear strength. Limestone bedrock lies at 1½ to 3 feet.	Severe limitations — moderate to moderately slow permeability in the subsoil; limestone bedrock lies at 1½ to 3 feet; most slopes greater than 7 percent. Contamination through the limestone crevices is a hazard.
Dunbarton silt loam (505D2, 505D3, 505E, 505E2, 505E3, 505F, 505F2, 505F3, 505G, 505G2, 505G3)	Subsoil and eroded slopes are poor — low in organic matter; clayey; subsoil material difficult to work.	Not suitable for sand or gravel; possible source of limestone for crushing at less than 2 feet.	Subsoil is very poor to poor; substratum is limestone bedrock, very good when crushed.	1 to 2 feet to limestone bedrock; moderate to high susceptibility to frost heave above the bedrock; unvegetated slopes highly erosive; topography strongly sloping to very steep; cuts will expose limestone bedrock difficult to vegetate; use of power machinery hazardous on steep slopes; excavation will be difficult; subsoil material is highly plastic.	Severe limitations in the subsoil — fair bearing capacity; high shrink-swell potential; poor to fair shear strength. Limestone bedrock lies at 1 to 2 feet.	Severe limitations — moderate to slow permeability in the subsoil; limestone bedrock lies at 1 to 2 feet; all slopes greater than 7 percent. Contamination through the limestone crevices is a hazard.
Dunbarton silt loam, cherty variant (511E3, 511F, 511F3, 511G2)	Surface is fair — contains chert fragments. Subsoil and eroded slopes are very poor — subsoil material very difficult to work; low in organic matter and contains chert fragments.	Not suitable for sand or gravel; possible source of limestone for crushing below 1 to 2 feet.	Subsoil is very poor; substratum is limestone bedrock, very good when crushed.	1 to 2 feet to limestone bedrock or residuum; high susceptibility to frost action above the bedrock; unvegetated slopes highly erosive; topography moderately steep to very steep; cuts will expose limestone bedrock difficult to vegetate; use of power machinery hazardous on very steep slopes; excavation will be difficult; highly plastic subsoil.	Severe limitations in the subsoil — fair bearing capacity; high shrink-swell potential; poor shear strength. Limestone bedrock lies at 1 to 2 feet.	Severe limitations — moderate to slow permeability in the subsoil, but limestone bedrock lies at 1 to 2 feet; all slopes greater than 12 percent. Contamination through the limestone crevices is a hazard.
Durand silt loam (416C, 416C2, 416D2, 416D3, 416E2, 416E3)	Surface is good. Eroded slopes are fair to poor. Subsoil is poor — low in organic matter; subsoil material difficult to work.	Not suitable above 5 feet in most places. Gravelly material below 5 feet in some places.	Subsoil is poor to very poor.	Moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; topography sloping to moderately steep; plastic subsoil material.	Moderate limitations — fair bearing capacity; moderate shrink-swell potential; fair shear strength.	Moderate limitations — moderate permeability. Severe limitations on slopes greater than 7 percent.
Edgington silt loam (272, 272+)	Surface is good. Subsoil is poor — low in organic matter; material difficult to work; frequent high water table.	Not suitable.	Subsoil is poor to very poor; substratum is fair to poor.	Water table frequently high; moderate to high susceptibility to frost heave; nearly level to depressional topography; plastic subsoil material.	Moderate limitations in the subsoil — fair bearing capacity; moderate shrink-swell potential; fair shear strength. Moderate limitations in the substratum — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength; frequent high water table.	Slight limitations — moderately slow to slow permeability; no limiting factors.

PROPERTIES OF SOILS IN CARROLL COUNTY, ILLINOIS

Soil features affecting suitability for engineering practices						
Septic tank sewage disposal systems	Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Grassed waterways
	Reservoir area	Embankments				
(8)	(9)	(10)	(11)	(12)	(13)	(14)
Severe limitations — moderate permeability, but frequent high water table.	Moderate seepage rate; frequent high water table; compacted dug ponds have low seepage rate if silty clay loam material is used to blanket the bottom of the impoundment area.	Silty clay loam subsoil — low seepage rate when compacted; fair stability and compaction character; good resistance to piping; moderate to high shrink-swell potential. Predominantly silt loam substratum — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential.	Frequent high water table; moderate permeability — tile functions satisfactorily in most places if outlets are obtained.	Medium water-intake rate; very high available water capacity; frequent high water table.	Nearly level topography — terraces not needed. Soil features favorable for constructing diversions to accommodate nearby hill water.	Nearly level topography — waterways not needed. Soil features favorable for constructing surface ditches to accommodate water from nearby grassed waterways.
Slight limitations — moderate permeability. Moderate limitations on 4- to 12-percent slopes. Severe limitations on slopes over 12 percent.	Moderate seepage rate.	Silty material — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential.	Soil is moderately well and well drained; natural drainage is adequate.	Medium water-intake rate; high available water capacity; slopes susceptible to severe water erosion.	Soil features favorable for construction of conventional or level terraces except some slopes exceed 12 percent.	Soil features favorable for construction and vegetation.
Severe limitations — moderate to moderately slow permeability in the subsoil, but limestone bedrock lies at 1½ to 3 feet; most slopes greater than 12 percent. Pollution through the limestone crevices is a hazard.	Moderate seepage rate in silty material; limestone bedrock lies at 1½ to 3 feet; water is lost as it seeps along fractures of the bedrock.	Predominantly silty clay loam subsoil — low seepage rate when compacted; fair stability and compaction character; good resistance to piping; moderate to high shrink-swell potential. Substratum is dense limestone bedrock — impractical to excavate for fill material in most places.	Soil is well drained; natural drainage is adequate.	Most favorable rooting area is limited to the 1½ to 3 feet above the limestone bedrock. Overlying silty material has a medium water-intake rate and moderate available water capacity; slopes susceptible to severe water erosion; some very steep slopes.	1½ to 3 feet to limestone bedrock or residuum; most slopes exceed 12 percent; in most places construction exposes bedrock and residuum difficult to work and vegetate.	Shallow and moderately deep, well-drained silty material over limestone bedrock; moderate available water capacity; in some places construction exposes bedrock and residuum difficult to work and vegetate; some very steep slopes.
Severe limitations — moderate to slow permeability in the subsoil; limestone bedrock lies at 1 to 2 feet; most slopes greater than 12 percent. Pollution through the limestone crevices is a hazard.	Moderately slow seepage rate in clayey material; limestone bedrock lies at 1 to 2 feet; water is lost as it seeps along fractures in the bedrock.	Predominantly clay subsoil — low seepage rate when compacted; fair to poor stability and compaction character; good resistance to piping; high shrink-swell potential. Substratum is dense limestone bedrock — impractical to excavate for fill material in most places.	Soil is well drained; natural drainage is adequate.	Most favorable rooting area is limited to the 1 to 2 feet above the limestone bedrock. Overlying clayey material has a slow water-intake rate and low available water capacity; slopes are susceptible to severe water erosion; some very steep slopes.	1 to 2 feet to limestone bedrock; most slopes exceed 12 percent; construction exposes bedrock and residuum difficult to work and vegetate.	Shallow, well-drained clayey material over limestone bedrock; low available water capacity; construction exposes bedrock and residuum difficult to work and vegetate; some very steep slopes.
Severe limitations — moderate to slow permeability in the subsoil; limestone bedrock lies at 1 to 2 feet; all slopes greater than 12 percent. Pollution through the limestone crevices is a hazard.	Moderately slow seepage rate in cherty and clayey material; limestone bedrock lies at 1 to 2 feet; water is lost as it seeps along fractures of the bedrock.	Predominantly cherty silty clay subsoil — low seepage rate when compacted; fair to poor stability and compaction character; good resistance to piping; high shrink-swell potential. Substratum is dense limestone bedrock — impractical to excavate for fill material in most places.	Soil is well drained; natural drainage is adequate.	Most favorable rooting area is limited to the 1 to 2 feet above the limestone bedrock. Overlying cherty and clayey material has a slow water-intake rate and low available water capacity; slopes susceptible to severe water erosion; some very steep slopes.	1 to 2 feet to limestone bedrock or residuum; chert fragments likely; all slopes exceed 12 percent; in most places construction exposes bedrock and residuum difficult to work and vegetate.	Shallow, well-drained cherty and clayey material over limestone bedrock; low available water capacity; in some places construction exposes bedrock and residuum difficult to work and vegetate; some very steep slopes.
Moderate permeability; moderate limitations on 4- to 12-percent slopes. Severe limitations on slopes greater than 12 percent.	Moderate seepage rate.	Silty clay loam and clay loam subsoil commonly extends below 5 feet — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential.	Soil is moderately well and well drained; natural drainage is adequate.	Medium water-intake rate; high available water capacity; slopes susceptible to severe water erosion.	Soil features favorable for construction except some slopes exceed 12 percent or are irregular. Exposed silty clay loam or clay loam subsoil has less favorable tilth and low organic matter content.	Soil features favorable for construction. Most cuts expose silty clay loam or clay loam subsoil, causing difficult seedbed preparation.
Severe limitations — moderately slow to slow permeability; frequent high water table.	Moderately slow seepage rate; frequent high water table; compacted dug ponds have low seepage rate if subsoil material is used to blanket the bottom of the impoundment area.	Silty clay loam subsoil — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential. Silt loam substratum — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential.	Frequent high water table; moderately slow to slow permeability; tile functions satisfactorily in some places if outlets are obtained.	Medium water-intake rate; high available water capacity; frequent high water table.	Nearly level topography — terraces not needed. Soil features favorable for constructing diversions to accommodate nearby hill water.	Nearly level topography — waterways not needed. Soil features favorable for constructing surface ditches to accommodate water from nearby grassed waterways.

TABLE 9 (cont.). — INTERPRETATIONS OF ENGINEERING

Soil series and map symbol	Suitability as a source of			Soil features affecting suitability for engineering practices		
	Topsoil	Sand or gravel	Highway subgrade material	Highway location	Foundations for low buildings	Sewage lagoon disposal systems
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Eleroy silt loam Mapped only in undifferentiated units with the Derinda series. See also Derinda. (949C2, 949D2, 949D3, 949E2, 949E3, 949F2)	Subsoil and eroded slopes are poor — low in organic matter; subsoil material difficult to work.	Not suitable; clay shale below 3 or 4 feet.	Subsoil is poor; substratum is very poor.	3 to 5 feet to shale material; moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; sloping to steep topography; seepy areas likely in cuts; some cuts expose shale material difficult to vegetate; subsoil and substratum are highly plastic.	Moderate limitations in the subsoil — fair bearing capacity; moderate shrink-swell potential; fair shear strength. Severe limitations in substratum — fair bearing capacity; high shrink-swell potential; poor shear strength.	Severe limitations — moderate permeability above shale material; most slopes greater than 7 percent.
Fayette silt loam (280B, 280B2, 280C, 280C2, 280D, 280D2, 280D3, 280E, 280E2, 280E3, 280F, 280F2, 280F3, 280G, 280G2)	Surface is good. Subsoil and eroded slopes are poor — low in organic matter; subsoil material difficult to work.	Not suitable.	Subsoil is very poor to poor; substratum is fair to poor.	Moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; topography gently sloping to very steep; use of power equipment hazardous on very steep slopes; plastic subsoil material.	Moderate limitations in the subsoil — fair bearing capacity; moderate shrink-swell potential; fair shear strength. Moderate limitations in the substratum — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength.	Moderate limitations — moderate permeability. Severe limitations on slopes greater than 7 percent.
Flagg silt loam (419B, 419C, 419C2, 419D, 419D2, 419D3, 419E2, 419E3)	Surface is good. Subsoil and eroded slopes are poor — low in organic matter; subsoil material difficult to work.	Not suitable in most places.	Subsoil and substratum are poor to very poor.	Moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; topography gently sloping to moderately steep; plastic subsoil material.	Moderate limitations in the subsoil and substratum — fair bearing capacity; moderate shrink-swell potential; fair shear strength.	Moderate limitations — moderate permeability. Severe limitations on slopes greater than 7 percent.
Fox silt loam Mapped only in complexes with the Casco series. See also Casco. (972D2 or XD2, 972E2 or XE2, 972E3, or XE3)	Subsoil and eroded slopes are poor — low in organic matter; subsoil material difficult to work.	Good for gravel; about 2 to 3 feet of overburden in most places.	Subsoil is poor to very poor; substratum is very good.	Moderate to high susceptibility to frost action in upper 2 to 3 feet; unvegetated slopes highly erosive; topography rolling to strongly rolling; cuts expose gravel difficult to vegetate; large boulders and stones hinder excavation; plastic subsoil material.	Moderate limitations in the subsoil — fair bearing capacity; moderate shrink-swell potential; fair shear strength. Slight limitations in the gravelly substratum except excavation will be difficult in some places.	Moderate limitations — moderate permeability. Severe limitations on slopes greater than 7 percent; danger of contamination through the underlying gravel.
Gale silt loam (413D2, 413F2)	Subsoil and eroded slopes are poor — low in organic matter; subsoil material difficult to work.	Not suitable for gravel; good source of sand if quarried.	Subsoil is poor to very poor; substratum is good to fair.	3 to 5 feet to sandstone material; moderate to high susceptibility to frost heave above the sandstone; unvegetated slopes highly erosive; strongly sloping to steep topography; some cuts expose sandstone material difficult to vegetate; plastic subsoil material.	Moderate limitations in the subsoil — fair bearing capacity; moderate shrink-swell potential; fair shear strength. Slight limitations in the substratum — good bearing capacity; low shrink-swell potential; fair to good shear strength.	Severe limitations — moderate permeability in overburden but rapid permeability in underlying sandstone material. Contamination through the sandstone material is a hazard. All slopes greater than 7 percent.
Gilford fine sandy loam (201)	Surface is good. Subsoil is fair — moderate available water capacity. Frequent high water table.	Good for sand; material too small for gravel. Frequent high water table.	Subsoil and substratum are good — all features favorable.	Frequent high water table; moderate to high susceptibility to frost heave depending on moisture content; topography nearly level.	Slight limitations if high water table is not a hazard — good bearing capacity; low shrink-swell potential; fair shear strength.	Severe limitations — moderately rapid permeability; danger of contamination.
Hamburg silt loam (30D2, 30F2, 30G2)	Fair — low in organic matter; material has high lime content.	Not suitable.	Fair.	Moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; topography strongly sloping to very steep; use of power equipment hazardous on very steep slopes.	Moderate limitations — poor bearing capacity; low shrink-swell potential; poor shear strength.	Severe limitations — moderately rapid permeability; all slopes greater than 7 percent.

PROPERTIES OF SOILS IN CARROLL COUNTY, ILLINOIS

Soil features affecting suitability for engineering practices						
Septic tank sewage disposal systems	Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Grassed waterways
	Reservoir area	Embankments				
(8)	(9)	(10)	(11)	(12)	(13)	(14)
Severe limitations — silty material above the shale is moderately permeable, but the shale has slow permeability; slopes range from 4 to 30 percent; effluent seepage likely on slopes.	Moderate seepage rate in silty material; slowly permeable clay shale lies at 3 to 5 feet.	Predominantly silty clay loam subsoil — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential. Silty clay to clay substratum — low seepage rate when compacted; fair to poor stability and compaction character; good resistance to piping; high shrink-swell potential.	Soil is moderately well and well drained; natural drainage is adequate in most places.	Most favorable rooting area is limited to the 3 to 4 feet above the shale bedrock. Overlying silty material has a medium water-intake rate and moderate to high available water capacity; slopes susceptible to severe water erosion.	Soil features favorable for construction of conventional terraces except some slopes exceed 12 percent or are irregular. Cuts for parallel terraces expose shale bedrock in some places; exposed silty clay loam subsoil has less favorable tilth and low organic matter content.	Soil features favorable for construction. Most cuts expose silty clay loam subsoil, causing difficult seedbed preparation.
Slight limitations — moderate permeability. Moderate limitations on 4- to 12-percent slopes. Severe limitations on slopes greater than 12 percent.	Moderate seepage rate.	Silty clay loam subsoil — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential. Silt loam substratum — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential.	Soil is well drained; natural drainage is adequate.	Medium water-intake rate; high to very high available water capacity; slopes susceptible to severe water erosion; some very steep slopes.	Soil features favorable for construction except some slopes exceed 12 percent. Exposed silty clay loam subsoil has less favorable tilth and low organic matter content.	Soil features favorable for construction. Some cuts expose silty clay loam subsoil, causing difficult seedbed preparation; some very steep slopes.
Slight limitations — moderate permeability. Moderate limitations on 4- to 12-percent slopes. Severe limitations on slopes greater than 12 percent.	Moderate seepage rate.	Silty clay loam and clay loam subsoil commonly extends below 5 feet — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential.	Soil is well drained; natural drainage is adequate.	Medium water-intake rate; high to very high available water capacity; slopes susceptible to severe water erosion.	Soil features favorable for construction except some slopes exceed 12 percent or are irregular. Exposed silty clay loam or clay loam subsoil has less favorable tilth and low organic matter content.	Soil features favorable for construction. Some cuts expose silty clay loam or clay loam subsoil, causing difficult seedbed preparation.
Moderate permeability; moderate limitations on 7- to 12-percent slopes. Severe limitations on slopes greater than 12 percent. Pollution is a hazard through the underlying gravel.	Moderate seepage rate in upper 2 to 3 feet; underlying gravel permits rapid seepage.	Silty clay loam and clay loam subsoil — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential. Substratum is mostly gravel-size material — rapid seepage rate even when compacted.	Soil is well drained; natural drainage is adequate.	Most favorable rooting area is limited to the 2 to 3 feet above the calcareous gravel. Overlying material has a medium water-intake rate and moderate available water capacity; slopes susceptible to severe water erosion.	2 to 3 feet to calcareous gravel; some slopes exceed 12 percent. Construction exposes subsoil material that has less favorable tilth and low organic matter content; in some places, deep cuts expose gravel difficult to work and vegetate.	Well-drained silty or loamy material, moderately deep in most places, over calcareous gravel; moderate available water capacity; in some places, deep cuts expose gravel difficult to work and vegetate.
Moderate permeability — moderate limitations on 7- to 12-percent slopes unless there is a pollution hazard. Severe limitations on slopes greater than 12 percent.	Moderate seepage rate in silty material; underlying sandstone material permits rapid seepage.	Silty clay loam subsoil — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential. Sandstone substratum — material too porous to hold water.	Soil is well drained; natural drainage is adequate.	Most favorable rooting area is limited to the 3 to 5 feet above the sandstone bedrock. Overlying silty material has a medium water-intake rate and moderate available water capacity; slopes susceptible to severe water erosion.	Soil features favorable for construction of conventional terraces, except some slopes exceed 12 percent or are irregular. Cuts for parallel terraces expose sandstone bedrock in some places. Exposed silty clay loam subsoil has less favorable tilth and low organic matter content.	Soil features favorable for construction. Most cuts expose silty clay loam subsoil, causing difficult seedbed preparation.
Severe limitations — moderately rapid permeability, but frequent high water table; danger of pollution in some places.	Moderately rapid seepage rate; material too porous to hold water; frequent high water table; dug ponds have rapid seepage even after compaction.	Sandy loam material — moderate seepage rate when compacted; fair stability and fair to good compaction character; poor resistance to piping; low shrink-swell potential. Substratum is sand — rapid seepage rate even when compacted.	Frequent high water table; sandy material; moderately rapid permeability; tile susceptible to becoming plugged with sand; surface drainage functions satisfactorily in most places if outlets are obtained.	Rapid water-intake rate; moderate available water capacity; frequent high water table.	Nearly level topography — terraces not needed. Construction of diversions to accommodate nearby hill water exposes loose sandy material in some places.	Nearly level topography — waterways not needed. Excavation for surface ditches to accommodate nearby grassed waterways exposes loose sandy material in some places.
Moderately rapid permeability; moderate limitations on 7- to 12-percent slopes. Severe limitations on slopes greater than 12 percent.	Moderately rapid seepage rate; pervious material.	Silt material — moderate seepage rate when compacted; poor stability and compaction character; resistance to piping; low shrink-swell potential.	Soil is well drained; natural drainage is adequate.	High lime content; rapid water-intake rate; low to moderate available water capacity; susceptible to water erosion; some very steep slopes.	Soil features favorable for construction of conventional or level terraces except most slopes exceed 12 percent.	Well-drained calcareous silt material; low to moderate available water capacity; difficult to establish and maintain vegetation; some very steep slopes.

TABLE 9 (cont.). — INTERPRETATIONS OF ENGINEERING

Soil series and map symbol (1)	Suitability as a source of: Topsoil (2)	Sand or gravel (3)	Highway subgrade material (4)	Soil features affecting suitability for engineering practices: Highway location (5)	Foundations for low buildings (6)	Sewage lagoon disposal systems (7)
Hitt silt loam (506C2, 506D2, 506D3, 506E2, 506F2)	Eroded slopes are fair to poor. Subsoil is poor — low in organic matter and difficult to work.	Not suitable for sand or gravel; possible source of limestone for crushing below 3 to 5 feet.	Subsoil is poor to very poor; substratum is limestone bedrock, very good when crushed.	3 to 5 feet to limestone bedrock or residuum; moderate to high susceptibility to frost heave above the bedrock; unvegetated slopes highly erosive; sloping to steep topography; some cuts expose limestone bedrock difficult to vegetate; excavation below 3 to 5 feet will be difficult; plastic subsoil.	Severe limitations in the subsoil — fair bearing capacity; moderate to high shrink-swell potential; fair to poor shear strength. Limestone bedrock lies at 3 to 5 feet.	Severe limitations — moderate permeability, but bedrock lies at 3 to 5 feet; most slopes greater than 7 percent; contamination hazard through the limestone crevices.
Hoopeston loam and Hoopeston sandy loam (237, 237+, $\overline{237}$, 172)	Surface is good. Underlying material is very poor — low in organic matter; moderate to low available water capacity. Occasional high water table.	Good for sand; material too small for gravel. Occasional high water table.	Subsoil and substratum are good — all features favorable.	Water table occasionally to frequently high; moderate to high susceptibility to frost heave depending on moisture content; topography nearly level to depressional; some areas are occasionally ponded.	Slight limitations if high water table is not a hazard — good bearing capacity; low shrink-swell potential; fair shear strength.	Severe limitations — moderately rapid permeability; danger of contamination; subject to ponding.
Huntsville silt loam (77)	Good to below 5 feet.	Not suitable in most places.	Poor to fair.	Moderate to high susceptibility to frost heave; topography nearly level; subject to infrequent flooding.	Moderate limitations — fair to poor bearing capacity; low to moderate shrink-swell potential; fair to poor shear strength.	Moderate limitations — moderate permeability. Subject to infrequent flooding.
Joy silt loam (275A, 275B)	Surface and subsoil material are good.	Not suitable.	Poor.	Occasional high water table in a few places; moderate to high susceptibility to frost heave; nearly level to gently undulating topography.	Moderate limitations — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength.	Moderate limitations — moderate permeability; slopes range from 0 to 4 percent.
Keltner silt loam (546C2, 546D2, 546E2, 546E3, 546F2)	Eroded slopes are fair to poor. Subsoil is poor — subsoil material is low in organic matter and difficult to work.	Not suitable; clay shale below 3 or 4 feet.	Subsoil is poor to very poor; substratum is very poor.	3 to 5 feet to shale material; moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; sloping to steep topography and seepy areas likely in cuts; some cuts expose shale material difficult to vegetate; subsoil and substratum are highly plastic.	Moderate limitations in the subsoil — fair bearing capacity; moderate shrink-swell potential; fair shear strength. Severe limitations in the substratum — fair bearing capacity; high shrink-swell potential; poor shear strength.	Severe limitations — moderate permeability above shale material; most slopes greater than 7 percent.
Lamont fine sandy loam (175B, 175C, 175C2, 175D, 175D2, 175D3, 175E2, 175E3, 175F2, 175F3) Also mapped in complexes with the Tell series as 952 or Z.	Surface is fair. Eroded slopes and subsoil are poor — low in organic matter and droughty.	Good for sand; material too small for gravel; less than 3½ feet to loose sand.	Subsoil is good to fair; substratum is good.	Low to moderate susceptibility to frost heave; unvegetated areas subject to water and wind erosion; gently undulating to steep topography; cuts expose drouthy sand difficult to vegetate.	Slight limitations — good bearing capacity; low shrink-swell potential; good to fair shear strength.	Severe limitations — moderately rapid permeability and danger of contamination; slopes range from 2 to 30 percent.
Lawson silt loam (451, $\overline{451}$)	Good to below 5 feet.	Not suitable in most places.	Poor to fair.	Occasional high water table; moderate to high susceptibility to frost heave; topography nearly level to depressional; subject to occasional flooding or ponding; plastic.	Moderate limitations — fair to poor bearing capacity; moderate shrink-swell potential; fair to poor shear strength. Occasional high water table.	Moderate limitations — moderate permeability; subject to occasional flooding and ponding.

PROPERTIES OF SOILS IN CARROLL COUNTY, ILLINOIS

Soil features affecting suitability for engineering practices

Septic tank sewage disposal systems (8)	Farm ponds: Reservoir area (9)	Farm ponds: Embankments (10)	Agricultural drainage (11)	Irrigation (12)	Terraces and diversions (13)	Grassed waterways (14)
Severe limitations — moderate permeability, but bedrock lies at 3 to 5 feet; some slopes greater than 12 percent; danger of pollution through the limestone crevices.	Moderate seepage rate in silty material; limestone bedrock lies at 3 to 5 feet; water is lost as it seeps along fractures of the bedrock.	Predominantly clay loam subsoil — low seepage rate when compacted; fair stability and compaction character; good resistance to piping; moderate to high shrink-swell potential. Substratum is dense limestone bedrock — impractical to excavate for fill material in most places.	Soil is well drained; natural drainage is adequate.	Most favorable rooting area is limited to the 3 to 5 feet above the limestone bedrock. Overlying loamy material has a medium water-intake rate and high to moderate available water capacity; slopes susceptible to severe water erosion.	Soil features favorable for construction of conventional terraces except some slopes exceed 12 percent or are irregular. Cuts for parallel terraces expose limestone bedrock in some places. Exposed clay loam subsoil has less favorable tilth and low organic matter content.	Soil features favorable for construction. Some cuts expose clay loam subsoil, causing difficult seedbed preparation.
Moderate limitations — moderately rapid permeability, but occasional to frequent high water table; danger of pollution in some places.	Moderately rapid seepage rate; material too porous to hold water; occasional to frequent high water table; dug ponds have moderate seepage rate even after compaction.	Sandy material — moderate seepage rate when compacted; fair stability and compaction character; poor resistance to piping; low shrink-swell potential.	Occasional to frequent high water table; sandy material; moderately rapid permeability; tile susceptible to becoming plugged with sand; surface drainage functions satisfactorily in most places if outlets are obtained.	Medium to rapid water-intake rate; moderate to low available water capacity; occasional to frequent high water table.	Nearly level topography — terraces not needed. Construction of diversions to accommodate nearby hill water exposes loose sandy material in some places.	Nearly level topography — waterways not needed. Excavation for surface ditches to accommodate nearby grassed waterways exposes loose sandy material in some places.
Slight limitations — moderate permeability. Subject to infrequent flooding.	Moderate seepage rate; dug ponds have low to moderate seepage rate after compaction.	Silty material — low to moderate seepage rate when compacted; fair to poor stability and compaction character; good to poor resistance to piping; low to moderate shrink-swell potential.	Soil is well and moderately well drained; natural drainage is adequate in most places; subject to infrequent flooding.	Medium water-intake rate; very high available water capacity; susceptible to infrequent flooding.	Nearly level topography — terraces not needed. Soil features favorable for constructing diversions to accommodate nearby hill water.	Nearly level topography — waterways not needed. Soil features favorable for constructing surface ditches to accommodate water from nearby grassed waterways.
Moderate permeability — slight limitations in most places; moderate limitations where water table is occasionally high.	Moderate seepage rate; dug ponds have moderate seepage rate even after compaction.	Silt loam material — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential.	Soil is somewhat poorly to moderately well drained; natural drainage is adequate in most places.	Medium water-intake rate; very high available water capacity.	Erosion not a hazard in most places — terraces not needed.	Nearly level to gently undulating topography — waterways not needed in most places.
Severe limitations — silty material above the shale is moderately permeable but the shale has slow permeability; slopes range from 4 to 30 percent; effluent seepage likely on slopes.	Moderate seepage rate in silty material; slowly permeable clay shale lies at 3 to 5 feet.	Predominantly silty clay loam subsoil — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential. Clay substratum — low seepage rate when compacted; fair to poor stability and compaction character; good resistance to piping; high shrink-swell potential.	Soil is moderately well and well drained; natural drainage is adequate in most places.	Most favorable rooting area is limited to the zone 3 to 4 feet above the shale bedrock. Overlying silty material has a medium water-intake rate and moderate to high available water capacity; slopes susceptible to severe water erosion.	Soil features favorable for construction of conventional terraces except some slopes exceed 12 percent or are irregular. Cuts for parallel terraces expose shale bedrock in some places; exposed silty clay loam subsoil has less favorable tilth and low organic matter content.	Soil features favorable for construction. Most cuts expose silty clay loam subsoil, causing difficult seedbed preparation.
Moderately rapid permeability — slight limitations where there is no pollution hazard. Moderate limitations on 4- to 12-percent slopes. Severe limitations on slopes greater than 12 percent.	Moderately rapid seepage rate.	Sandy loam material — moderate seepage rate when compacted; fair stability and fair to good compaction character; poor resistance to piping; low shrink-swell potential. Substratum is sand — rapid seepage rate even when compacted.	Soil is well drained; natural drainage is adequate.	Most favorable rooting area is limited to the 2 to 3 feet above the loose sand. Overlying sandy loam material has a rapid water-intake rate and low available water capacity; susceptible to wind and water erosion.	Moderately rapid permeability — water erosion is not a severe hazard. 2 to 3 feet to loose sand; some slopes exceed 12 percent. Deep cuts expose loose sand difficult to vegetate; channels subject to accumulation from wind erosion.	Shallow, well-drained sandy loam material over loose sand; low available water capacity; in some places construction exposes loose sand difficult to vegetate; subject to accumulation from wind erosion.
Moderate limitations — moderate permeability; occasional high water table. Severe limitations where occasional flooding and ponding are a hazard.	Moderate seepage rate; occasional high water table; dug ponds have low to moderate seepage after compaction.	Silty material — low to moderate seepage rate when compacted; fair to poor stability and compaction character; good to poor resistance to piping; moderate shrink-swell potential.	Occasional high water table; moderate permeability; tile functions satisfactorily; subject to stream overflow.	Medium water-intake rate; very high available water capacity; occasional high water table; susceptible to stream overflow.	Nearly level topography — terraces not needed. Soil features favorable for constructing diversions to accommodate nearby hill water.	Nearly level topography — waterways not needed. Soil features favorable for constructing surface ditches to accommodate water from nearby grassed waterways.

TABLE 9 (cont.). — INTERPRETATIONS OF ENGINEERING

Soil series and map symbol	Suitability as a source of			Soil features affecting suitability for engineering practices		
	Topsoil	Sand or gravel	Highway subgrade material	Highway location	Foundations for low buildings	Sewage lagoon disposal systems
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lena muck (210, $\overline{210}$)	Poor when used alone; oxidizes readily and is erosive. Fair to good if mixed with mineral soil. Frequent high water table.	Not suitable.	Not suitable.	Muck, greater than 4 feet thick; frequent high water table; high susceptibility to frost heave; subject to wind erosion if drained; subject to frequent ponding; topography nearly level to depressional; very unstable.	Severe limitations in muck — poor bearing capacity; high volume change due to compressibility and subsidence; poor shear strength. Moderate limitations in underlying loamy material — fair to poor bearing capacity; low to moderate shrink-swell potential; fair shear strength. Frequent high water table.	Severe limitations — over 15-percent organic matter content; contamination is a hazard in some places. Subject to frequent ponding.
Littleton silt loam (81A, 81B, 81C)	Good to below 5 feet.	Not suitable in most places.	Poor to very poor.	Occasional high water table; moderate to high susceptibility to frost heave; topography nearly level to sloping.	Moderate limitations in the subsoil — fair bearing capacity; moderate shrink-swell potential; fair shear strength. Moderate limitations in substratum — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength. Occasional high water table.	Moderate limitations — moderate permeability; slopes range from 0 to 7 percent.
Loran silt loam (572C, 572D, 572D2)	Surface is good. Eroded slopes are fair. Subsoil is poor — subsoil material is low in organic matter and difficult to work.	Not suitable; clay shale below 3 or 4 feet.	Subsoil is poor to very poor; substratum is very poor.	3 to 5 feet to shale material; occasional high water table; moderate to high susceptibility to frost heave; unvegetated slopes somewhat erosive; topography sloping to strongly sloping; seepy areas likely in cuts; some cuts expose shale material difficult to vegetate; subsoil and substratum are highly plastic.	Severe limitations in the subsoil and substratum — fair bearing capacity; moderate to high shrink-swell potential; fair to poor shear strength. Occasional high water table.	Moderately slow permeability — moderate limitations on 4- to 7-percent slopes. Severe limitations on slopes greater than 7 percent.
Millington silt loam (82, $\overline{82}$)	Good to below 5 feet in most places; material has high lime content; frequent high water table.	Not suitable in most places.	Poor to fair.	Frequent high water table; moderate to high susceptibility to frost heave; subject to frequent flooding and ponding; topography nearly level to depressional.	Moderate limitations — fair to poor bearing capacity; moderate shrink-swell potential; fair to poor shear strength. Frequent high water table.	Moderate limitations — moderate permeability. Subject to frequent flooding and ponding.
Mixed Alluvial Land (455)	Specific interpretations for Mixed Alluvial Land are not given. Because of its inaccessibility, much of this land was not examined in the detailed mapping of Carroll County. Based on the location of this land, severe hazards for highway locations, sewage disposal systems, agricultural drainage, and irrigation can be predicted. This land is depressional to gently sloping but is subject to annual flooding and has a permanent high water table in most places.					
Mt. Carroll silt loam (268B, 268C, 268C2, 268D2)	Surface and subsoil are good.	Not suitable.	Fair to poor.	Moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; topography gently undulating to rolling.	Moderate limitations — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength.	Moderate limitations — moderate permeability. Severe limitations on slopes greater than 7 percent.
Muscatine silt loam (41A, 41B)	Surface is good. Subsoil is poor — low in organic matter and difficult to work.	Not suitable.	Subsoil is very poor; substratum is poor to fair.	Occasional high water table; moderate to high susceptibility to frost heave; nearly level to gently sloping topography; plastic subsoil material.	Severe limitations in the subsoil — fair bearing capacity; moderate to high shrink-swell potential; fair to poor shear strength. Moderate limitations in substratum — fair to poor bearing capacity; moderate shrink-swell potential; fair to poor shear strength. Occasional high water table.	Moderate limitations — moderate permeability; slopes range from 0 to 4 percent.

PROPERTIES OF SOILS IN CARROLL COUNTY, ILLINOIS

Soil features affecting suitability for engineering practices						
Septic tank sewage disposal systems (8)	Farm ponds: Reservoir area (9)	Farm ponds: Embankments (10)	Agricultural drainage (11)	Irrigation (12)	Terraces and diversions (13)	Grassed waterways (14)
Severe limitations — frequent high water table and frequent ponding. Pollution is a hazard in some places.	Muck — moderate seepage rate where water table is lowered; frequent high water table; turbid water likely in dug ponds.	Muck — not suitable for embankments.	Frequent high water table; muck to below 4 feet; moderate permeability; tile susceptible to settling out of alignment; if outlets are obtained, surface ditches work satisfactorily and can be blocked to control water level; subject to stream overflow and ponding.	High lime content; rapid water-intake rate; very high available water capacity; frequent high water table; susceptible to ponding and overflow; subject to wind erosion where water table is lowered.	Nearly level to depressional topography — terraces not needed. In most places, topography not suitable for construction of diversions to accommodate nearby hill water.	Nearly level to depressional topography — waterways not needed. Surface ditches work satisfactorily to accommodate nearby grassed waterways.
Moderate limitations — moderate permeability; occasional high water table; slopes range from 0 to 7 percent.	Moderate seepage rate; occasional high water table; dug ponds have moderate to low seepage rate after compaction.	Silty material — moderate to low seepage rate when compacted; poor to fair stability and compaction character; good to poor resistance to piping; low to moderate shrink-swell potential.	Occasional high water table; moderate permeability; tile functions satisfactorily if outlets are obtained.	Medium water-intake rate; very high available water capacity; occasional high water table.	Erosion not a hazard in most places — terraces not needed. Soil features favorable for constructing diversions to accommodate nearby hill water.	Somewhat poorly drained silty material; very high available water capacity; some waterways remain wet for extended periods after rains. Tile in conjunction with waterways needed in most places.
Severe limitations — moderately slow permeability; occasional high water table; slopes range from 4 to 12 percent; effluent seepage likely on slopes.	Moderate seepage rate in silty material; slowly permeable clay shale lies at 3 to 5 feet; occasional high water table.	Predominantly silty clay loam subsoil — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate to high shrink-swell potential. Clay substratum — low seepage rate when compacted; fair to poor stability and compaction character; good resistance to piping; high shrink-swell potential.	Occasional high water table; moderately slow permeability; slopes range from 4 to 12 percent. Specially designed drainage systems will be needed in most places.	Most favorable rooting area is limited to the 3 to 4 feet above the shale bedrock. Overlying silty material has a slow water-intake rate; high available water capacity; occasional high water table; slopes are susceptible to water erosion.	Soil features favorable for construction of conventional terraces. Cuts for parallel terraces expose shale bedrock in some places; exposed silty clay loam subsoil has less favorable tilth and low organic matter. Most channels will remain wet for long periods after rains.	Soil features favorable for construction. Some cuts expose silty clay loam subsoil, causing difficult seedbed preparation; somewhat poorly drained subsoil; some waterways remain wet for long periods after rains.
Severe limitations — moderate permeability but frequent high water table and frequent flooding and ponding.	Moderate seepage rate; frequent high water table; dug ponds have low to moderate seepage after compaction.	Silty and loamy material — low to moderate seepage rate when compacted; fair to poor stability and compaction character; good to poor resistance to piping; moderate shrink-swell potential.	Frequent high water table; moderate permeability; tile functions satisfactorily; subject to stream overflow.	High lime content; medium water-intake rate; high available water capacity; frequent high water table; susceptible to stream overflow.	Nearly level to depressional topography — terraces not needed. In most places, topography not suited for construction of diversions to accommodate nearby hill water.	Nearly level to depressional topography — waterways not needed. Surface ditches work satisfactorily to accommodate nearby grassed waterways.
Slight limitations — moderate permeability. Moderate limitations on 4- to 12-percent slopes.	Moderate seepage rate.	Silt loam material — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential.	Soil is moderately well and well drained; natural drainage is adequate.	Medium water-intake rate; very high available water capacity; slopes susceptible to severe water erosion.	Soil features favorable for construction of conventional or level terraces except some slopes are irregular.	Soil features favorable for construction and vegetation.
Moderate limitations — moderate permeability but occasional high water table.	Moderate seepage rate; occasional high water table; compacted dug ponds have low seepage rate if subsoil material is used to blanket the bottom of the impoundment area.	Silty clay loam subsoil — low seepage rate when compacted; fair stability and compaction character; good resistance to piping; moderate to high shrink-swell potential. Silt loam substratum — low to moderate seepage rate when compacted; fair to poor stability and compaction character; good to poor resistance to piping; moderate shrink-swell potential.	Occasional high water table; moderate permeability; tile functions satisfactorily in most places if outlets are obtained.	Medium water-intake rate; very high available water capacity; occasional high water table.	Erosion not a hazard in most places — terraces not needed. Soil features favorable for constructing diversions to accommodate nearby hill water.	Nearly level to gently sloping topography — waterways not needed in most places. Soil features favorable for constructing surface ditches to accommodate water from nearby grassed waterways.

TABLE 9 (cont.). — INTERPRETATIONS OF ENGINEERING

Soil series and map symbol	Suitability as a source of			Soil features affecting suitability for engineering practices		
	Topsoil	Sand or gravel	Highway subgrade material	Highway location	Foundations for low buildings	Sewage lagoon disposal systems
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Myrtle silt loam (414B, 414C, 414C2, 414D2)	Surface is good. Eroded slopes are fair. Subsoil is poor — subsoil material is low in organic matter and difficult to work.	Not suitable above 5 feet in most places; mixed sand and gravel lie below 5 feet in some areas.	Subsoil is poor to very poor.	Moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; topography gently sloping to strongly sloping; plastic subsoil material.	Moderate limitations — fair bearing capacity; moderate shrink-swell potential; fair shear strength.	Moderate limitations — moderate permeability. Severe limitations on slopes greater than 7 percent.
Niota silt loam (261)	Surface is good in upper 9 inches, fair in lower 8 inches. Subsoil is very poor — clayey; frequent high water table.	Not suitable.	Subsoil and substratum are very poor.	Frequent high water table; high susceptibility to frost heave; topography nearly level; subsoil and substratum material are highly plastic.	Severe limitations — fair bearing capacity; high shrink-swell potential; poor shear strength. Frequent high water table.	Slight limitations — very slow permeability.
Niota silty clay loam, clayey subsurface variant (568A, 568B)	Surface is fair. Subsoil is very poor — clayey; frequent high water table.	Not suitable.	Subsoil is very poor; substratum is poor.	Frequent high water table; high susceptibility to frost heave; topography nearly level to gently sloping; highly plastic subsoil material.	Severe limitations in the subsoil — poor to fair bearing capacity; high shrink-swell potential; poor shear strength. Moderate limitations in the substratum — fair bearing capacity; moderate shrink-swell potential; fair shear strength. Frequent high water table.	Very slow permeability — slight limitations on 0- to 2-percent slopes. Moderate limitations on slopes greater than 2 percent.
Ogle silt loam (412C, 412C2, 412D2, 412D3, 412E2)	Surface is good. Eroded slopes are fair to poor. Subsoil is poor — subsoil material is low in organic matter and difficult to work.	Not suitable in most places.	Subsoil is poor to very poor.	Moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; topography sloping to moderately steep; plastic subsoil material.	Moderate limitations — fair bearing capacity; moderate shrink-swell potential; fair shear strength.	Moderate limitations — moderate permeability. Severe limitations on slopes greater than 7 percent.
Ogle silt loam, silt loam subsoil variant (574B, 574C)	Surface is good. Upper subsoil is fair; lower subsoil is poor — low in organic matter and difficult to work.	Not suitable.	Upper subsoil is fair to poor; lower subsoil is poor to very poor.	Moderate to high susceptibility to frost heave; topography gently sloping to sloping; plastic lower subsoil.	Moderate limitations in upper subsoil — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength. Moderate limitations in the lower subsoil — fair bearing capacity; moderate shrink-swell potential; fair shear strength.	Moderate limitations — moderate permeability; slopes range from 2 to 7 percent.
Onarga fine sandy loam, reddish subsoil variant (673B)	Surface is good. Subsoil is poor — low organic matter and material is difficult to work.	Not suitable for sand or gravel above 4 feet. Sand lies below 4 feet in most places.	Subsoil is fair to very poor; substratum is mostly fair to poor.	Moderate to high susceptibility to frost heave; topography gently undulating; plastic subsoil material.	Moderate limitations — fair to poor bearing capacity; moderate to low shrink-swell potential; fair to poor shear strength.	Moderate limitations — moderate permeability. Contamination is a hazard in some places; slopes range from 2 to 4 percent.
Orion silt loam (415)	Good to below 5 feet.	Not suitable in most places.	Fair to poor.	Occasional high water table; moderate to high susceptibility to frost heave; topography nearly level; subject to occasional flooding.	Moderate limitations — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength. Occasional high water table.	Moderate limitations — moderate permeability. Subject to occasional flooding.
Otter silt loam (76, $\overline{76}$)	Good to below 5 feet; frequent high water table.	Not suitable in most places.	Fair to poor.	Frequent high water table; moderate to high susceptibility to frost heave; subject to frequent flooding and ponding; topography nearly level to depressional; plastic.	Moderate limitations — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength. Frequent high water table.	Moderate limitations — moderate permeability. Subject to frequent flooding and ponding.

PROPERTIES OF SOILS IN CARROLL COUNTY, ILLINOIS

Soil features affecting suitability for engineering practices

Septic tank sewage disposal systems (8)	Farm ponds: Reservoir area (9)	Farm ponds: Embankments (10)	Agricultural drainage (11)	Irrigation (12)	Terraces and diversions (13)	Grassed waterways (14)
Slight limitations — moderate permeability. Moderate limitations on 4- to 12-percent slopes.	Moderate seepage rate.	Silty clay loam and clay loam subsoil commonly extend below 5 feet — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential.	Soil is well drained; natural drainage is adequate.	Medium water-intake rate; high to very high available water capacity; slopes susceptible to severe water erosion.	Soil features favorable for construction except some slopes are irregular. Exposed silty clay loam or clay loam subsoil has less favorable tilth and low organic matter content.	Soil features favorable for construction. Some cuts expose silty clay or clay loam subsoil, causing difficult seedbed preparation.
Severe limitations — very slow permeability; frequent high water table.	Very slow seepage rate; frequent high water table; compacted dug ponds impervious to seepage.	Silty clay to clay subsoil and substratum — impervious to low seepage rate when compacted; fair to poor stability and compaction character; good resistance to piping; high shrink-swell potential.	Frequent high water table; very slow permeability — will not respond to tiling; surface drainage functions satisfactorily if outlets are obtained.	Slow water-intake rate; moderate available water capacity; frequent high water table.	Nearly level topography — terraces not needed. Construction of diversions to accommodate nearby hill water will expose clayey material difficult to work and vegetate.	Nearly level topography — waterways not needed. Excavation for surface ditches to accommodate water from nearby grassed waterways will expose silty clay to clay material.
Severe limitations very slow permeability; frequent high water table.	Very slow seepage rate; frequent high water table; compacted dug ponds are impervious or have a low seepage rate.	Silty clay subsoil — impervious or low seepage rate when compacted; poor to fair stability and compaction character; fair to good resistance to piping; high shrink-swell potential. Silty clay loam substratum — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential.	Frequent high water table; very slow permeability — will not respond to tiling; surface drainage functions satisfactorily if outlets are obtained.	Slow water-intake rate; moderate available water capacity; frequent high water table.	Nearly level to gently sloping topography — terraces not needed. Construction of diversions to accommodate nearby hill water will expose clayey material difficult to work and vegetate.	Nearly level to gently sloping topography — waterways not needed. Excavation for surface ditches to accommodate water from nearby grassed waterways will expose silty clay subsoil.
Moderate permeability — moderate limitations on 4- to 12-percent slopes. Severe limitations on slopes greater than 12 percent.	Moderate seepage rate.	Silty clay loam and clay loam subsoil commonly extends below 5 feet — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential.	Soil is well drained; natural drainage is adequate.	Medium water-intake rate; high to very high available water capacity; slopes susceptible to severe water erosion.	Soil features favorable for construction except some slopes exceed 12 percent or are irregular. Exposed silty clay loam subsoil has less favorable tilth and low organic matter content.	Soil features favorable for construction. Most cuts expose silty clay loam subsoil, causing difficult seedbed preparation.
Slight limitations — moderate permeability. Moderate limitations on 4- to 7-percent slopes.	Moderate seepage rate.	Silt loam upper subsoil — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential. Clay loam lower subsoil — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential.	Soil is well drained; natural drainage is adequate.	Medium water-intake rate; high to very high available water capacity; slopes susceptible to water erosion.	Soil features favorable for construction and vegetation.	Soil features favorable for construction and vegetation.
Moderate permeability; slight limitations unless underlying sandy material causes a pollution hazard.	Moderate seepage rate.	Predominantly clay loam subsoil — low to moderate seepage rate when compacted; fair to poor stability and compaction character; good to poor resistance to piping; moderate to low shrink-swell potential.	Soil is well drained; natural drainage is adequate.	Medium to rapid water-intake rate and moderate available water capacity; susceptible to wind erosion.	Erosion is not a hazard in most places and terraces are not needed. Soil features favorable for constructing diversions to accommodate nearby hill water.	Well-drained loamy to sandy material — moderate available water capacity; subject to accumulation from wind erosion.
Moderate limitations — moderate permeability; occasional high water table. Severe limitations where occasional flooding is a hazard.	Moderate seepage rate; occasional high water table; dug ponds have moderate to low seepage after compaction.	Silty material — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential.	Occasional high water table; moderate permeability; tile functions satisfactorily; subject to stream overflow.	Medium water-intake rate; very high available water capacity; occasional high water table; susceptible to stream overflow.	Nearly level topography — terraces not needed. Soil features favorable for constructing diversions to accommodate nearby hill water.	Nearly level topography — waterways not needed. Soil features favorable for constructing surface ditches to accommodate water from nearby grassed waterways.
Severe limitations — moderate permeability, but frequent high water table and frequent flooding and ponding.	Moderate seepage rate; frequent high water table; dug ponds have moderate to low seepage after compaction.	Silty material — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential.	Frequent high water table; moderate permeability; tile functions satisfactorily; subject to stream overflow.	Medium water-intake rate; very high available water capacity; frequent high water table; susceptible to stream overflow.	Nearly level to depressional topography — terraces not needed. In most places topography is not suited for construction of diversions to accommodate nearby hill water.	Nearly level to depressional topography — waterways not needed. Surface ditches work satisfactorily to accommodate nearby grassed waterways.

TABLE 9 (cont.). — INTERPRETATIONS OF ENGINEERING

Soil series and map symbol (1)	Suitability as a source of: Topsoil (2)	Sand or gravel (3)	Highway subgrade material (4)	Soil features affecting suitability for engineering practices: Highway location (5)	Foundations for low buildings (6)	Sewage lagoon disposal systems (7)
Palms muck (100, $\overline{100}$)	Organic layer is poor — oxidizes readily and is erosive; fair to good if mixed with mineral soil. Underlying silty material is good. Frequent high water table.	Not suitable.	Organic material is unsuitable; underlying silty material is fair to poor.	Muck, less than 4 feet thick; frequent high water table; high susceptibility to frost heave; subject to wind erosion if drained; subject to frequent ponding and flooding; topography nearly level to depressional; very unstable.	Severe limitations in muck — poor bearing capacity; high volume change due to compressibility and subsidence; poor shear strength. Moderate limitations in underlying silty material — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength. Frequent high water table.	Severe limitations — over 15-percent organic matter content. Subject to frequent ponding and flooding in some places.
Palsgrove silt loam Mapped only in undifferentiated units with the Dubuque and Woodbine series. See also the appropriate series. (With Dubuque: 950C, 950C2, 950D, 950D2, 950D3, 950E, 950E2, 950E3, 950F, 950F2, 950F3, 950G, 950G2) (With Woodbine: 951C or YC, 951C2 or YC2, 951D or YD, 951D2 or YD2, 951D3 or YD3, 951E or YE, 951E2 or YE2, 951E3 or YE3, 951F or YF, 951F2 or YF2, 951F3 or YF3, 951G2 or YG2, 951G3 or YG3)	Surface is good. Eroded slopes and subsoil are poor — low in organic matter, and subsoil material is difficult to work.	Not suitable for sand or gravel; possible source of limestone for crushing below 3 to 5 feet.	Subsoil is poor to very poor; substratum is limestone bedrock, very good when crushed.	3 to 5 feet to limestone bedrock or residuum; moderate to high susceptibility to frost heave above the bedrock; unvegetated slopes highly erosive; topography moderately sloping to very steep; use of power machinery hazardous on very steep slopes; some cuts will expose limestone bedrock difficult to vegetate; excavation below 3 to 5 feet will be difficult; plastic subsoil.	Severe limitations in the subsoil — fair bearing capacity; moderate to high shrink-swell potential; fair to poor shear strength. Limestone bedrock lies at 3 to 5 feet.	Severe limitations — moderate permeability, but bedrock lies at 3 to 5 feet and in most places slopes are greater than 7 percent; contamination through the limestone crevices is a hazard.
Pecatonica silt loam (21B, 21C, 21C2, 21C3, 21D, 21D2, 21D3, 21E, 21E2, 21E3, 21F, 21F2, 21F3)	Surface is good. Eroded slopes and subsoil are poor — low in organic matter, and subsoil material is difficult to work.	Not suitable above 5 feet in most places.	Subsoil is poor to very poor; substratum is fair to poor.	Moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; topography gently sloping to steep; plastic subsoil material.	Moderate limitations in the subsoil — fair bearing capacity; moderate shrink-swell potential; fair shear strength. Moderate limitations in the substratum — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength.	Moderate limitations — moderate permeability. Severe limitations on slopes greater than 7 percent.
Plainfield sand (54B, 54C3, 54F2)	Surface and underlying material are very poor — low available water capacity and organic matter.	Good for sand; material too small for gravel.	Good — all features favorable.	Low susceptibility to frost heave; unvegetated areas subject to severe wind erosion; gently undulating to steep topography; loose sand hinders traction of road machinery.	Slight limitations — good bearing capacity; low shrink-swell potential; good shear strength.	Severe limitations — rapid permeability; danger of contamination; slopes range from 2 to 30 percent.
Port Byron silt loam (277A, 277B, 277C, 277C2, 277D, 277D2, 277D3)	Surface and subsoil material are good.	Not suitable.	Poor.	Moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; nearly level to rolling topography.	Moderate limitations — fair to poor bearing capacity; low to moderate shrink-swell potential; fair to poor shear strength.	Moderate permeability — moderate limitations on 0- to 7-percent slopes. Severe limitations on slopes greater than 7 percent.

PROPERTIES OF SOILS IN CARROLL COUNTY, ILLINOIS

Soil features affecting suitability for engineering practices						
Septic tank sewage disposal systems	Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Grassed waterways
	Reservoir area	Embankments				
(8)	(9)	(10)	(11)	(12)	(13)	(14)
Severe limitations — frequent high water table and frequent ponding and flooding. Pollution is a hazard in some places.	Less than 4 feet of muck over silty material; moderate seepage rate in muck where water table is lowered; where ponds are excavated, underlying silty material has moderate to low seepage even after compaction; turbid water in dug ponds likely.	Less than 4 feet of muck over silty material — muck not suitable for embankments. Silty substratum — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential.	Frequent high water table; less than 4 feet of muck over silty material; moderate permeability in muck and moderate permeability in silty material; tile placed in muck susceptible to settling out of alignment; if outlets are obtained, surface ditches work satisfactorily and can be blocked to control water level; subject to stream overflow and ponding.	Rapid to medium water-intake rate depending on depth to underlying silty material; very high available water capacity; frequent high water table; susceptible to ponding and overflow; subject to wind erosion where water table is lowered.	Nearly level to depressional topography — terraces not needed. In most places topography is not suited for construction of diversions to accommodate nearby hill water.	Nearly level to depressional topography — waterways not needed. Surface ditches work satisfactorily to accommodate nearby grassed waterways.
Severe limitations — moderate permeability, but limestone bedrock lies at 3 to 5 feet. Slopes range from 4 percent to greater than 30 percent; danger of pollution through the limestone crevices.	Moderate seepage rate in silty or loamy material; limestone bedrock lies at 3 to 5 feet. Water is lost as it seeps along fractures of the bedrock.	Silty clay loam or clay loam subsoil — low seepage rate when compacted; fair stability and compaction character; good resistance to piping; moderate to high shrink-swell potential. Substratum is dense limestone bedrock — impractical to excavate for fill material in most places.	Soil is well drained; natural drainage is adequate.	Most favorable rooting area is limited to the 3 to 5 feet above the limestone bedrock. Overlying silty or loamy material has a medium water-intake rate and moderate to high available water capacity; slopes susceptible to severe water erosion; some very steep slopes.	Soil features favorable for construction of conventional terraces except most slopes exceed 12 percent or are irregular. Cuts for parallel terraces expose limestone bedrock in some places. Exposed silty clay loam or clay loam subsoil has less favorable tilth and low organic matter content.	Soil features favorable for construction. Some cuts expose silty clay loam or clay loam subsoil, causing difficult seedbed preparation.
Slight limitations — moderate permeability. Moderate limitations on 4- to 12-percent slopes. Severe limitations on slopes greater than 12 percent.	Moderate seepage rate.	Silty clay loam and clay loam subsoil — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential. Predominantly loam to sandy loam substratum — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential.	Soil is moderately well and well drained; natural drainage is adequate.	Medium water-intake rate; high available water capacity; slopes susceptible to severe water erosion.	Soil features favorable for construction except some slopes exceed 12 percent or are irregular. Exposed silty clay loam or clay loam subsoil has less favorable tilth and low organic matter content.	Soil features favorable for construction. Some cuts expose silty clay loam or clay loam subsoil, causing difficult seedbed preparation.
Rapid permeability — slight limitations where there is no pollution hazard. Moderate limitations on 4- to 12-percent slopes. Severe limitations on slopes greater than 12 percent.	Rapid seepage rate; too porous to hold water.	Sandy material — rapid seepage rate even when compacted.	Soil is excessively drained; natural drainage is adequate.	Rapid water-intake rate; low to very low available water capacity; susceptible to severe wind erosion.	Infiltration and permeability are rapid; water erosion is not a hazard in most places and terraces are not needed.	Well-drained sandy material; low to very low available water capacity; difficult to establish and maintain vegetation; subject to accumulation from wind erosion.
Slight limitations — moderate permeability. Moderate limitations on 4- to 12-percent slopes.	Moderate seepage rate.	Silt loam material — low to moderate seepage rate when compacted; fair to poor stability and compaction character; good to poor resistance to piping; low to moderate shrink-swell potential.	Soil is moderately well and well drained; natural drainage is adequate.	Medium water-intake rate; very high available water capacity; slopes susceptible to severe water erosion.	Soil features favorable for construction of conventional or level terraces except some slopes are irregular.	Soil features favorable for construction and vegetation.

TABLE 9 (cont.). — INTERPRETATIONS OF ENGINEERING

Soil series and map symbol	Suitability as a source of			Soil features affecting suitability for engineering practices		
	Topsoil	Sand or gravel	Highway sub-grade material	Highway location	Foundations for low buildings	Sewage lagoon disposal systems
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Port Byron silt loam, sandy substratum (562B, 562C, 562C2, 562D, 562D2)	Surface and subsoil material are good.	Good for sand below 3 to 5 feet.	Subsoil is fair to poor; substratum is good.	Moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; topography gently undulating to rolling; some cuts will expose sand difficult to vegetate.	Moderate limitations in the subsoil — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength. Slight limitations in the substratum — good bearing capacity; low shrink-swell potential; good to fair shear strength.	Moderate to severe limitations depending on depth to sand material — moderate permeability in the silty overburden; rapid permeability in underlying sand material and danger of contamination. Severe limitations on all slopes over 7 percent.
Rodman gravelly loam (93E2)	Surface is fair to poor — high lime content; low in organic matter; gravel and stones likely to be present. Underlying gravel material is very poor.	Good for gravel.	Very good — all features favorable.	Large stones and boulders present; low susceptibility to frost action; slopes are difficult to vegetate and are subject to erosion; strongly rolling topography; cuts expose gravel difficult to vegetate; boulders and stones hinder excavation.	Slight limitations — good bearing capacity; low shrink-swell potential; good shear strength; excavation will be difficult in most places.	Severe limitations — very rapid permeability; danger of contamination; slopes range from 12 to 18 percent.
Rozetta silt loam (279A, 279B, 279C)	Surface is good. Subsoil is poor — low in organic matter, and subsoil material is difficult to work.	Not suitable.	Subsoil is very poor to poor; substratum is fair to poor.	Moderate to high susceptibility to frost heave; topography nearly level to sloping; plastic subsoil material.	Moderate limitations in the subsoil — fair bearing capacity; moderate shrink-swell potential; fair shear strength. Moderate limitations in the substratum — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength.	Moderate limitations — moderate permeability; slopes range from 0 to 7 percent.
Sable silty clay loam (68, 68+)	Surface is good where there is silty overburden, fair under usual conditions. Subsoil is poor — clayey; frequent high water table.	Not suitable.	Subsoil is poor to very poor; substratum is poor.	Water table frequently high; moderate to high susceptibility to frost heave; topography depressional to nearly level; the clayey surface and subsoil are plastic.	Severe limitations in the subsoil — fair bearing capacity; moderate to high shrink-swell potential; fair to poor shear strength. Moderate limitations in the substratum — fair bearing capacity; moderate to high shrink-swell potential; fair shear strength. Frequent high water table.	Moderate limitations — moderate permeability.
Sawmill silty clay loam (107, $\overline{107}$, 107+)	Surface is good where there is silty overburden, fair under usual conditions. Subsoil is poor — clayey; frequent high water table.	Not suitable in most places.	Very poor; substratum is poor.	Frequent high water table; moderate to high susceptibility to frost heave; subject to frequent flooding and ponding; topography nearly level to depressional; the clayey surface and subsoil are plastic.	Severe limitations — fair to poor bearing capacity; high shrink-swell potential; poor to fair shear strength. Moderate limitations in the substratum — fair bearing capacity; moderate to high shrink-swell potential; fair shear strength. Frequent high water table.	Moderate limitations — moderate to moderately slow permeability. Subject to frequent flooding and ponding.
Seaton silt loam (274B, 274C, 274D, 274D2, 274D3, 274E, 274E2, 274E3, 274F, 274F2, 274F3, 274G2)	Surface is good. Subsoil and eroded slopes are fair — low in organic matter.	Not suitable.	Fair to poor.	Moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; topography gently undulating to very steep; use of power machinery hazardous on very steep slopes.	Moderate limitations — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength.	Moderate limitations — moderate permeability. Severe limitations on slopes greater than 7 percent.
Seaton silt loam, sandy substratum (563B, 563C, 563C2, 563D, 563D2, 563D3, 563E3)	Surface is good. Subsoil and eroded slopes are fair — low in organic matter.	Good for sand below 3 to 5 feet.	Subsoil is fair to poor; substratum is good.	Moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; topography gently undulating to strongly rolling; some cuts will expose drouthy sand difficult to vegetate.	Moderate limitations in the subsoil — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength. Slight limitations in the substratum — good bearing capacity; low shrink-swell potential; good to fair shear strength.	Moderate to severe limitations depending on depth to sand material. Moderate permeability in the silty overburden; rapid permeability in underlying sand material, danger of contamination. Severe limitations on all slopes over 7 percent.

PROPERTIES OF SOILS IN CARROLL COUNTY, ILLINOIS

Soil features affecting suitability for engineering practices

Septic tank sewage disposal systems (8)	Farm ponds: Reservoir area (9)	Farm ponds: Embankments (10)	Agricultural drainage (11)	Irrigation (12)	Terraces and diversions (13)	Grassed waterways (14)
Moderate permeability — slight limitations unless there is a pollution hazard. Moderate limitations on 4- to 12-percent slopes.	Moderate seepage rate in silty material; loose sand lies at depths greater than 3 to 5 feet and permits rapid seepage.	Silt loam subsoil — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential. Sandy substratum — rapid seepage rate even when compacted.	Soil is well drained; natural drainage is adequate.	Most favorable rooting area is limited to the 3 to 5 feet above the loose sandy material. Overlying silty material has a medium water-intake rate and high available water capacity; slopes susceptible to severe water erosion.	Soil features favorable for construction of conventional or level terraces except some slopes are irregular. Cuts for parallel terraces expose sand in some places.	Soil features favorable for construction and vegetation.
Very rapid permeability — Severe limitations on slopes greater than 12 percent. Pollution is a hazard in some places.	Less than 1 foot to calcareous gravel; very rapid seepage rate.	Gravel material — very rapid seepage rate even when compacted.	Soil is excessively drained; natural drainage is adequate.	High lime content; rapid water-intake rate; very low available water capacity; subject to water erosion.	Less than 1 foot to calcareous gravel; gravel and stones in most places; all slopes exceed 12 percent. Construction exposes calcareous gravel — exposed gravel is difficult to work and vegetate.	Very shallow, excessively drained loamy material over calcareous gravel; very low available water capacity; gravel and stones in most places; construction exposes gravel difficult to work and vegetate.
Slight limitations — moderate permeability. Moderate limitations on 4- to 7-percent slopes.	Moderate seepage rate.	Silty clay loam subsoil — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential. Silt loam subsoil — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential.	Soil is moderately well drained; natural drainage is adequate.	Medium water-intake rate; high to very high available water capacity; slopes susceptible to water erosion.	Soil features favorable for construction and vegetation.	Soil features favorable for construction and vegetation.
Severe limitations — moderate permeability, but frequent high water table.	Moderate seepage rate; frequent high water table; compacted dug ponds have low seepage rate if silty clay loam material is used to blanket bottom of impoundment area.	Silty clay loam subsoil — low seepage rate when compacted; fair stability and compaction character; good resistance to piping; moderate to high shrink-swell potential. Silt loam substratum — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential.	Frequent high water table; moderate permeability; tile functions satisfactorily in most places if outlets are obtained.	Medium water-intake rate; very high available water capacity; frequent high water table.	Nearly level topography — terraces are not needed. Soil features favorable for constructing diversions to accommodate nearby hill water.	Nearly level topography — waterways not needed. Soil features favorable for constructing surface ditches to accommodate water from nearby grassed waterways.
Severe limitations — moderate to moderately slow permeability, but frequent high water table and frequent flooding and ponding.	Moderate seepage rate; frequent high water table; dug ponds have low seepage after compaction.	Silty clay loam material — low seepage rate when compacted; fair to poor stability and compaction character; good to fair resistance to piping; high shrink-swell potential. Predominantly silt loam substratum — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential.	Frequent high water table; moderate to moderately slow permeability; tile functions satisfactorily; subject to stream overflow.	Medium water-intake rate; very high available water capacity; frequent high water table; susceptible to stream overflow.	Nearly level topography — terraces not needed. Soil features are favorable for constructing diversions to accommodate nearby hill water.	Nearly level topography — waterways not needed. Soil features favorable for constructing surface ditches to accommodate water from nearby grassed waterways.
Slight limitations — moderate permeability. Moderate limitations on 4- to 12-percent slopes. Severe limitations on slopes over 12 percent.	Moderate seepage rate.	Silt loam material — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential.	Soil is well drained; natural drainage is adequate.	Medium water-intake rate; very high available water capacity; slopes susceptible to severe water erosion; some very steep slopes.	Soil features favorable for construction of conventional or level terraces except some slopes exceed 12 percent or are irregular.	Soil features favorable for construction and vegetation.
Moderate permeability — slight limitations unless there is a pollution hazard. Moderate limitations on 4- to 12-percent slopes; severe limitations on slopes greater than 12 percent.	Moderate seepage rate in silty material; loose sand lies at depths greater than 3 to 5 feet and permits rapid seepage.	Silt loam subsoil — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential. Sandy substratum — rapid seepage rate even when compacted.	Soil is well drained; natural drainage is adequate.	Most favorable rooting area is limited to the 3 to 5 feet above the loose sandy material. Overlying silty material has a medium water-intake rate and high available water capacity; slopes susceptible to severe water erosion.	Soil features favorable for construction of conventional or level terraces except some slopes exceed 12 percent or are irregular. Cuts for parallel terraces expose sand in some places.	Soil features favorable for construction and vegetation.

TABLE 9 (cont.). — INTERPRETATIONS OF ENGINEERING

Soil series and map symbol (1)	Suitability as a source of			Soil features affecting suitability for engineering practices		
	Topsoil (2)	Sand or gravel (3)	Highway subgrade material (4)	Highway location (5)	Foundations for low buildings (6)	Sewage lagoon disposal systems (7)
Selma loam (125)	Surface is good. Subsoil is poor — clayey; frequent high water table.	Good for sand; about 3 to 5 feet of overburden in most places.	Subsoil is poor to very poor; substratum is good.	Frequent high water table; moderate to high susceptibility to frost heave; topography nearly level; plastic subsoil material.	Moderate limitations in the subsoil — fair bearing capacity; moderate shrink-swell potential; fair shear strength. Slight limitations in the substratum — good bearing capacity; low shrink-swell potential; good shear strength. Frequent high water table.	Moderate limitations — moderate permeability; danger of contamination through underlying sand.
Sogn silt loam (504E2, 504G2)	Surface is fair — contains some stony material and is about 1 foot to limestone bedrock.	Not suitable fo sand or gravel; good source of limestone for crushing.	Limestone bedrock is very good when crushed.	About 1 foot to limestone bedrock; moderate to high susceptibility to frost heave above the bedrock; unvegetated slopes highly erosive; topography strongly sloping to very steep; cuts will be very difficult to vegetate; use of power machinery hazardous on very steep slopes; excavation will be difficult.	Limestone bedrock at about 1 foot.	Severe limitations — moderate permeability in silty material, but limestone bedrock lies at about 1 foot; all slopes greater than 12 percent. Contamination through the limestone crevices is a hazard.
Sparta loamy sand (88A, 88B, 88C, 88C2, 88D, 88E)	Surface and underlying material are poor — low to very low available water capacity.	Good for sand; material too small for gravel.	Good — all features favorable.	Low susceptibility to frost heave; unvegetated areas subject to severe wind erosion; nearly level to strongly rolling topography; loose sand hinders road machinery traction.	Slight limitations — good bearing capacity; low shrink-swell potential; good shear strength.	Severe limitations — rapid to very rapid permeability and danger of contamination; slopes range from 0 to 18 percent.
Strawn silt loam (224C2, 224D2, 224E2, 224E3, 224F2, 224F3)	Eroded slopes and subsoil are poor — low in organic matter, and subsoil material is difficult to work; some stones likely to be present.	Not suitable; material too fine textured in most places.	Subsoil is poor to very poor; substratum is fair to poor.	Moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; sloping to steep topography; cuts expose calcareous loam till difficult to vegetate; plastic subsoil material.	Moderate limitations in the underlying loam till — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength.	Moderate limitations — moderate permeability. Severe limitations on slopes greater than 7 percent.
Sylvan silt loam (19E3, 19F2, 19F3, 19G2, 19G3)	Eroded slopes and subsoil are poor — low in organic matter, and subsoil material is difficult to work.	Not suitable.	Subsoil is poor to very poor; substratum is fair to poor.	Moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; topography moderately steep to very steep; most cuts expose calcareous loess difficult to vegetate; use of power equipment hazardous on very steep slopes; plastic subsoil material.	Moderate limitations in underlying silty material — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength.	Severe limitations — moderate permeability, but all slopes are greater than 7 percent.
Tama silt loam (36A, 36B, 36B2, 36C, 36C2, 36C3, 36D, 36D2, 36D3, 36E2, 36E3)	Surface is good. Eroded slopes are fair. Subsoil is poor — low in organic matter and difficult to work.	Not suitable.	Subsoil is very poor to poor; substratum is poor.	Moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; topography nearly level to moderately steep; plastic subsoil material.	Moderate limitations in the subsoil and substratum — fair bearing capacity; moderate shrink-swell potential; fair shear strength.	Moderate limitations — moderate permeability. Severe limitations on slopes greater than 7 percent.
Tell silt loam (565B, 565C, 565C2, 565D, 565D2, 565D3, 565E2, 565E3, 565F2, 565F3) Also mapped in complexes with the Lamont series as 952 or Z.	Surface is good. Subsoil and eroded slopes are fair — low in organic matter.	Good for sand below about 1½ to 3 feet.	Subsoil is fair to poor; substratum is good.	Moderate to high susceptibility to frost heave above the sand; unvegetated slopes highly erosive; topography gently undulating to steep; cuts will expose drouthy sand difficult to vegetate.	Moderate limitations in the subsoil — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength. Slight limitations in the substratum — good bearing capacity; low shrink-swell potential; fair shear strength.	Severe to moderate limitations depending on depth to sandy material — moderate permeability in the silty overburden; rapid permeability in underlying sandy material and danger of contamination. Severe limitations on all slopes over 7 percent.

PROPERTIES OF SOILS IN CARROLL COUNTY, ILLINOIS

Soil features affecting suitability for engineering practices						
Septic tank sewage disposal systems	Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Grassed waterways
	Reservoir area	Embankments				
(8)	(9)	(10)	(11)	(12)	(13)	(14)
Severe limitations — moderate permeability but frequent high water table. Pollution is a hazard through the underlying sand.	Moderate seepage rate in loamy material; loose sand lies at 3 to 5 feet and permits rapid seepage; frequent high water table; compacted dug ponds have low seepage rate if clay loam subsoil is used to blanket exposed sand.	Clay loam subsoil — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential. Sand substratum — rapid seepage rate even when compacted.	Frequent high water table; moderate permeability; tile functions satisfactorily in most places if outlets are obtained.	Medium water-intake rate; high available water capacity; frequent high water table.	Nearly level topography — terraces are not needed. Soil features favorable for constructing diversions to accommodate nearby hill water.	Nearly level topography — waterways not needed. Soil features favorable for constructing surface ditches to accommodate water from nearby grassed waterways.
Severe limitations — moderate permeability in silty material, but limestone bedrock lies at about 1 foot. All slopes are greater than 12 percent. Pollution through the limestone crevices is a hazard.	Moderate seepage rate in silty material; limestone bedrock lies at about 1 foot; water is lost as it seeps along fractures of the bedrock.	Silty material too thin in most places to use as borrow. Substratum is dense limestone bedrock — impractical to excavate for fill material in most places.	Soil is well drained; natural drainage is adequate.	Most favorable rooting area is limited to the very shallow zone above the limestone bedrock. Thin overlying layer has a medium water-intake rate and very low available water capacity; slopes susceptible to severe water erosion; some very steep slopes.	Limestone bedrock lies at about 1 foot; construction exposes or excavates bedrock difficult to work and vegetate; all slopes exceed 12 percent.	Well-drained silty material that is very shallow to underlying limestone bedrock; very low available water capacity; construction exposes bedrock difficult to work and vegetate; some very steep slopes.
Rapid to very rapid permeability; slight limitations where there is no pollution hazard; moderate limitations on 4- to 12-percent slopes. Severe limitations on slopes greater than 12 percent.	Rapid seepage rate; material too porous to hold water.	Sandy material — rapid seepage rate even when compacted.	Soil is excessively drained; natural drainage is adequate.	Rapid water-intake rate; low to very low available water capacity; susceptible to wind erosion.	Infiltration and permeability are rapid to very rapid; water erosion not a hazard in most places and terraces are not needed.	Well-drained sandy material; low to very low available water capacity; difficult to establish and maintain vegetation; subject to accumulation from wind erosion.
Moderate permeability — moderate limitations on 4- to 12-percent slopes. Severe limitations on slopes greater than 12 percent.	Moderate seepage rate; calcareous loam till lies below about 2 feet.	Subsoil layer too thin in most places to use as borrow. Substratum is loam till — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential.	Soil is well drained; natural drainage is adequate.	Most favorable rooting area is limited to the upper 2 feet of soil above the calcareous loam till. Overlying material has a medium water-intake rate and moderate available water capacity; slopes susceptible to severe water erosion.	Less than 2 feet to calcareous loam till; most slopes exceed 12 percent. In some places construction exposes calcareous loam till difficult to vegetate.	Shallow, well-drained loamy material over calcareous loam till; moderate available water capacity; construction exposes loam till in some places — calcareous loam till is difficult to vegetate.
Severe limitations — moderate permeability, but all slopes are greater than 12 percent.	Moderate seepage rate.	Silty clay loam subsoil — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential. Silt loam substratum — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential.	Soil is well drained; natural drainage is adequate.	Most favorable rooting area is limited to the 1 to 3 feet above the calcareous loess. Overlying material has a medium water-intake rate; high available water capacity; slopes susceptible to severe water erosion; some very steep slopes.	Soil features favorable but all slopes exceed 12 percent. Exposed silty clay loam subsoil has less favorable tilth and low organic matter content; in some places construction exposes calcareous loess difficult to vegetate.	Soil features favorable for construction. Most cuts expose silty clay loam subsoil, causing difficult seedbed preparation; some cuts expose calcareous loess difficult to vegetate; some very steep slopes.
Slight limitations — moderate permeability. Moderate limitations on 4- to 12-percent slopes. Severe limitations on slopes greater than 12 percent.	Moderate seepage rate.	Silty clay loam subsoil and silt loam substratum — low seepage rate when compacted; fair to good stability and compaction character; good resistance to piping; moderate shrink-swell potential.	Soil is moderately well and well drained; natural drainage is adequate.	Medium water-intake rate; very high available water capacity; slopes susceptible to severe water erosion.	Soil features favorable for construction except some slopes exceed 12 percent or are irregular. Exposed silty clay loam subsoil has less favorable tilth and low organic matter content.	Soil features favorable for construction. Some cuts expose silty clay loam subsoil, causing difficult seedbed preparation.
Moderate permeability in silty material; rapid permeability in underlying sandy material. Slight limitations unless there is a pollution hazard. Moderate limitations on 4- to 12-percent slopes. Severe limitations on slopes greater than 12 percent.	Moderate seepage rate in silty material; loose sand lies at less than about 3 feet and permits rapid seepage.	Silt loam subsoil — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential. Sandy substratum — rapid seepage rate even when compacted.	Soil is well drained; natural drainage is adequate.	Most favorable rooting area is limited to less than 3 feet above the loose sand. Overlying silty material has a medium water-intake rate and moderate available water capacity; slopes susceptible to severe water erosion.	Soil features favorable for construction of conventional or level terraces except some slopes exceed 12 percent or are irregular. Cuts for parallel terraces expose sand in some places.	Soil features favorable for construction and establishing vegetation; moderate available water capacity; maintaining vegetation difficult in some places.

TABLE 9 (cont.). — INTERPRETATIONS OF ENGINEERING

Soil series and map symbol	Suitability as a source of			Soil features affecting suitability for engineering practices		
	Topsoil	Sand or gravel	Highway subgrade material	Highway location	Foundations for low buildings	Sewage lagoon disposal systems
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Terrace Escarpments (577D, 577E, 577F)	Material is very poor — clayey.	Not suitable.	Very poor.	High susceptibility to frost heave; unvegetated slopes highly erosive; topography strongly sloping to very steep; use of power equipment hazardous on very steep slopes; highly plastic.	Severe limitations — fair bearing capacity; high shrink-swell potential; poor shear strength.	Severe limitations — very slow permeability, but all slopes are greater than 7 percent.
Timula silt loam (271E2, 271F2, 271G2)	Eroded slopes and subsoil are fair — low in organic matter.	Not suitable.	Fair.	Moderate to high susceptibility to frost heave; unvegetated slopes highly erosive; topography moderately steep to very steep; most cuts expose calcareous loess difficult to vegetate; use of power machinery hazardous on very steep slopes.	Moderate limitations — poor bearing capacity; low shrink-swell potential; poor shear strength.	Severe limitations — moderate permeability, but all slopes are greater than 12 percent.
Wakeland silt loam (333)	Good to below 5 feet.	Not suitable in most places.	Fair to poor.	Occasional high water table; moderate to high susceptibility to frost heave; topography nearly level; subject to occasional flooding.	Moderate limitations — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength. Occasional high water table.	Moderate limitations — moderate permeability. Subject to occasional flooding.
Waukegan silt loam (564B, 564C, 564C2, 564D2, 564E2)	Surface and subsoil material are good.	Good for sand below about 1½ to 3 feet.	Subsoil is fair to poor; substratum is good.	Moderate to high susceptibility to frost heave above the sand; unvegetated slopes highly erosive; topography gently undulating to strongly rolling; cuts expose drouthy sand difficult to vegetate.	Moderate limitations in the subsoil — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength. Slight limitations in the substratum — good bearing capacity; low shrink-swell potential; fair shear strength.	Severe to moderate limitations depending on depth to sand material — moderate permeability in the silty overburden; rapid permeability in underlying sand material and danger of contamination. Severe limitations on all slopes greater than 7 percent.
Woodbine silt loam Mapped only in undifferentiated units with the Palsgrove series. See also Palsgrove. (951C or YC, 951C2 or YC2, 951D or YD, 951D2 or YD2, 951D3 or YD3, 951E or YE, 951E2 or YE2, 951E3 or YE3, 951F or YF, 951F2 or YF2, 951F3 or YF3, 951G2 or YG2, 951G3 or YG3)	Surface is good. Eroded slopes and subsoil are poor — low in organic matter, and subsoil material is difficult to work.	Not suitable for sand or gravel; possible source of limestone for crushing below 3 to 5 feet.	Subsoil is poor to very poor; substratum is limestone bedrock, very good when crushed.	3 to 5 feet to limestone bedrock or residuum; moderate to high susceptibility to frost heave above the bedrock; unvegetated slopes highly erosive; topography sloping to very steep; use of power machinery hazardous on very steep slopes; some cuts will expose limestone bedrock difficult to vegetate; excavation below 3 to 5 feet will be difficult; plastic subsoil.	Severe limitations in the subsoil — fair bearing capacity; moderate to high shrink-swell potential; fair to poor shear strength. Limestone bedrock at 3 to 5 feet deep.	Severe limitations — moderate permeability, but bedrock lies at 3 to 5 feet and in most places slopes are greater than 7 percent; contamination through the limestone crevices is a hazard.
Worthen silt loam (37A, 37B, 37C, 37D2)	Surface and subsoil material are good.	Not suitable.	Poor.	Moderate to high susceptibility to frost heave; unvegetated slopes subject to erosion; nearly level to strongly sloping topography.	Moderate limitations — poor to fair bearing capacity; moderate shrink-swell potential; poor to fair shear strength.	Moderate permeability — moderate limitations on 0- to 7-percent slopes. Severe limitations on slopes greater than 7 percent.
Zwingle silt loam (576A, 576B, 576C)	Surface is good. Subsoil is poor to very poor — clayey; occasional high water table.	Not suitable.	Subsoil is poor to very poor; substratum is fair to poor.	Occasional high water table; high susceptibility to frost heave; unvegetated slopes subject to erosion; nearly level to sloping topography; highly plastic subsoil.	Severe limitations in the subsoil — fair bearing capacity; moderate to high shrink-swell potential; fair to poor shear strength. Moderate limitations in the substratum — poor to fair bearing capacity; low to moderate shrink-swell potential; poor to fair shear strength. Occasional high water table.	Slight limitations — very slow permeability. Moderate limitations on 2- to 7-percent slopes.

PROPERTIES OF SOILS IN CARROLL COUNTY, ILLINOIS

Soil features affecting suitability for engineering practices						
Septic tank sewage disposal systems	Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Grassed waterways
	Reservoir area	Embankments				
(8)	(9)	(10)	(11)	(12)	(13)	(14)
Severe limitations — very slow permeability. Slopes range from 7 percent to greater than 30 percent.	Very slow seepage rate.	Predominantly clayey material — low seepage rate when compacted; fair to poor stability and compaction character; good resistance to piping; high shrink-swell potential.	Variable soil drainage; natural drainage is adequate in most places.	Slow water-intake rate and moderate available water capacity in most places; slopes susceptible to severe water erosion.	Silty clay or clayey material in most places; most slopes exceed 12 percent; clayey material difficult to work and vegetate; most channels will remain wet for long periods after rains.	Variable soil drainage; clayey material in most places; moderate available water capacity; clayey material difficult to work and vegetate; most waterways will remain wet for long periods after rains.
Severe limitations — moderate permeability, but all slopes are greater than 12 percent.	Moderate seepage rate.	Silt loam material — moderate seepage rate when compacted; poor stability and compaction character and resistance to piping; low shrink-swell potential.	Soil is well drained; natural drainage is adequate.	Most favorable rooting area is limited to the 1 to 3 feet above the calcareous loess. Overlying material has a medium water-intake rate; high available water capacity; slopes susceptible to severe water erosion; some very steep slopes.	Soil features favorable for conventional and level terraces but all slopes exceed 12 percent. In some places construction exposes calcareous loess difficult to vegetate.	Soil features favorable for construction and vegetation; some cuts expose calcareous loess difficult to vegetate; some very steep slopes.
Moderate limitations — moderate permeability; occasional high water table. Severe limitations where occasional flooding is a hazard.	Moderate seepage rate; occasional high water table; dug ponds have moderate seepage after compaction.	Silty material — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential.	Occasional high water table; moderate permeability; tile functions satisfactorily; subject to stream overflow.	Medium water-intake rate; high to very high available water capacity; occasional high water table; susceptible to stream overflow.	Nearly level topography — terraces not needed. Soil features favorable for constructing diversions to accommodate nearby hill water.	Nearly level topography — waterways not needed. Soil features favorable for constructing surface ditches to accommodate water from nearby grassed waterways.
Moderate permeability in silty material; rapid permeability in underlying sandy material. Slight limitations unless there is a pollution hazard. Moderate limitations on 4- to 12-percent slopes. Severe limitations on slopes greater than 12 percent.	Moderate seepage rate in silty material; loose sand lies at less than about 3 feet and permits rapid seepage.	Silt loam subsoil — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential. Sandy substratum — rapid seepage rate even when compacted.	Soil is well drained; natural drainage is adequate.	Most favorable rooting area is limited to less than 3 feet above the loose sand. Overlying silty material has a medium water-intake rate and moderate available water capacity; slopes susceptible to severe water erosion.	Soil features favorable for construction of conventional or level terraces except some slopes exceed 12 percent or are irregular; cuts for parallel terraces expose sand in some places.	Soil features favorable for construction and for establishing vegetation; moderate available water capacity; maintaining vegetation difficult in some places.
Severe limitations — moderate permeability, but limestone bedrock lies at 3 to 5 feet. Slopes range from 4 percent to greater than 30 percent; danger of pollution through limestone crevices.	Moderate seepage rate in silty or loamy material; limestone bedrock lies at 3 to 5 feet; water is lost as it seeps along fractures of the bedrock.	Silty clay loam or clay loam subsoil — low seepage rate when compacted; fair stability and compaction character; good resistance to piping; moderate to high shrink-swell potential. Substratum is dense limestone bedrock — impractical to excavate for fill material in most places.	Soil is well drained; natural drainage is adequate.	Most favorable rooting area is limited to the 3 to 5 feet above the limestone bedrock. Overlying silty or loamy material has a medium water-intake rate and moderate to high available water capacity; slopes susceptible to severe water erosion; some very steep slopes.	Soil features favorable for construction of conventional terraces except most slopes exceed 12 percent or are irregular. Cuts for parallel terraces expose limestone bedrock in some places. Exposed silty clay loam or clay loam subsoil has less favorable tilth and low organic matter content.	Soil features favorable for construction; some cuts expose silty clay loam or clay loam subsoil, causing difficult seedbed preparation.
Slight limitations — moderate permeability. Moderate limitations on 4- to 12-percent slopes.	Moderate seepage rate.	Silt loam material — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; moderate shrink-swell potential.	Soil is moderately well and well drained; natural drainage is adequate.	Medium water-intake rate; very high available water capacity; slopes susceptible to water erosion.	Soil features favorable for construction of conventional or level terraces.	Soil features favorable for construction and vegetation.
Severe limitations — very slow permeability and occasional high water table. Slopes range from 0 to 7 percent.	Very slow seepage rate; occasional high water table.	Silty clay loam to silty clay subsoil — low seepage rate when compacted; fair stability and compaction character; good resistance to piping; moderate to high shrink-swell potential. Loam substratum — moderate to low seepage rate when compacted; poor to fair stability and compaction character; poor to good resistance to piping; low to moderate shrink-swell potential.	Occasional high water table; very slow permeability — will not respond to tiling; surface drainage functions satisfactorily for nearby level areas; specially designed drainage systems will be needed on the more sloping soil.	Slow water-intake rate; clayey subsoil; moderate available water capacity; occasional high water table; slopes susceptible to water erosion.	About 1 foot to clayey subsoil; construction exposes clayey subsoil difficult to work and vegetate; most channels will remain wet for long periods after rains.	Somewhat poorly drained clayey subsoil material; moderate available water capacity; in most places construction exposes clayey subsoil difficult to work and vegetate; some waterways remain wet for long periods after rains.

races and diversions are not needed on nearly level soils, but diversion construction and layout interpretations are given for those soils that must accommodate nearby hill water. Soil feature interpretations are not given for vegetative practices that reduce or curb wind erosion. However, the conservation engineer can refer to Column 12, "Irrigation," and Column 14, "Grassed waterways," to determine the soils' physical features when planning a wind erosion control program.

Column 14. The "Grassed waterways" column includes those features and qualities of the soils that affect their suitability for grassed waterways. The major soil features considered in establishing and maintaining grassed waterways when they are other than favorable are natural internal drainage, texture and depth of soil material, available water capacity, and tilth as affected by exposure of subsoil or substrata. Less prevalent features such as susceptibility to wind erosion accumulation, susceptibility of waterways' remaining wet for long periods following rains, and hazards of construction and establishing vegetation on very steep slopes are given consideration where applicable. In most places waterways are not needed on nearly level soils, but the feasibility of surface ditches to accommodate the water from a nearby waterway is mentioned where appropriate.

SOIL TEST DATA

Soil test data are reported in Table 10 for 14 soil profiles representing 5 Carroll County soil series. These soils were sampled at locations selected to illustrate textural variations within each soil series. The tests were made by the Illinois Division of Highways, Bureau of Materials. Not all horizons of each soil profile were sampled; however, these test results, along with test data from soils in other counties, were useful as a general guide for estimating the engineering properties of other soil series in Carroll County.

FORMATION AND CLASSIFICATION OF CARROLL COUNTY SOILS

Factors of Soil Formation

Those who have tilled the soil of Carroll County and most individuals who have observed its differing landscapes appreciate the fact that soil properties in Carroll County differ from place to place. We continually strive to learn why soils differ, how they differ, and the importance of these differences in regard to the behavior and management requirements of soils for the variety of uses we make of them.

Soils are the result of the action of numerous chemical, physical, and biological processes. These processes are controlled or conditioned by a group of soil-forming factors. These factors are (1) the nature of the soil parent materials; (2) climatic characteristics, especially rainfall and temperature; (3) the kind of plant and animal life associated with the soil, especially the native vegetation; (4) the topography or slope of the land surface, particularly as it influences the moisture condition of the soil and its natural drainage; and (5) the amount of time soil development processes have been active and the rate or intensity of these processes. These major factors of soil formation, acting together in various combinations, account for the differences among soils. These factors and their influence on soils of Carroll County are discussed in the following sections.

PARENT MATERIAL

The major parent materials of Carroll County soils were deposited during the glacial period, but some soils are partially developed in the sedimentary bedrock, which is many thousands of years older.

Loess is the dominant parent material in upland areas and on some of the terraces. This silty material, deposited by wind, was blown from the Mississippi River flood plain. Loess is more than 30 feet thick on ridgetops near the Mississippi River and gradually thins in an easterly direction to a depth of slightly less than 10 feet on ridgetops in the northeastern and eastern parts of the county (*19*). Loess is less than 5 feet thick, regardless of slope, in an upland area in the southwestern part of the county, including parts of York, Mt. Carroll, and Fairhaven Townships (*17*). Loess is an excellent parent material because of its silty texture, moderate bulk density and permeability, and well-balanced mineral content (*3*). Fifteen of the soil series in the county have developed entirely in loess, including Tama, the most extensive soil series in Carroll County. Many of the remaining soils are developed partly in loess that overlies other materials.

Loess is frequently thin, and in places entirely absent, on steeper slopes of the upland. On these slopes soils may be developed partly in loess but also in till, sand, or gravel, which are also of glacial origin. Where loess and other glacial deposits in upland areas are thin, the sedimentary bedrock is an important parent material. The bedrock is dominantly dolomitic limestone, but shale is important in some places and sandstone occurs at shallow depths in a few places in the extreme eastern part of the county.

Sandy soils in the upland occur mainly in the southwestern part of the county except for an area in northern Washington Township (T25N, R3E). In some places the sandy parent material was probably blown onto the upland by wind, but it may be the result of glacial action and melting, especially in the southwestern area.

Soils formed in stream terrace or bluff-wash parent materials occur mainly along the major streams and

vary greatly in texture. Extremely sandy soils occur on much of the Mississippi River terrace along with loamy and silty soils. Lacustrine deposits, which are dominantly silty clay to clay texture in their upper few feet, are the parent material for a small but significant group of soils that occur mainly on the Plum River terraces north and east of Savanna.

The flood plains of the major streams contain recently deposited sediments derived from upland slopes. The soils developed in these materials are primarily

TABLE 10. — ENGINEERING TEST DATA[a] FOR SOIL SAMPLES FROM 14 SOIL PROFILES, CARROLL COUNTY, ILLINOIS

Soil name and location	Parent material	Report No.	Depth	Horizon	Moisture-density[b]: Maximum dry density	Moisture-density[b]: Optimum moist.	Mechanical analysis[c], Percentage passing sieve: 1½ - in.	1 - in.	3/4 - in.	½ - in.	3/8 - in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 20 (0.8 mm.)	No. 40 (0.42 mm.)	No. 100 (0.15 mm.)	No. 200 (0.074 mm.)	Percent: Sand	Silt	Clay	Liquid limit	Plasticity index	Classification: AASHO[d]	Unified[e]
			in.		pcf	%																		
SPARTA LOAMY SAND																								
T24N, R3E, Sec. 24; SW160, SW40, SE10 (modal profile).	Terrace sands	59-11786	0-20	A1	114	11	-	-	-	-	-	-	100	99	75	15	12	88	5	7	-	NP	A-2-4(0)	SM-SP
		59-11787	25-33	B	111	12	-	-	-	-	-	-	100	99	77	12	8	92	4	4	-	NP	A-3(0)	SM-SP
		59-11788	55-65	C2	108	7	-	-	-	-	-	100	99	89	35	4	1	99	0	1	-	NP	A-2-4(0)	SP
T23N, R3E, Sec. 25; SE160, SE40, SE10 (finer textured).	Terrace sands	59-11789	0-22	A1	113	10	-	-	-	-	-	-	100	99	82	21	13	87	8	5	-	NP	A-2-4(0)	SM
		59-11790	37-47	B21	110	11	-	-	-	-	-	-	100	99	80	17	8	92	4	4	-	NP	A-3(0)	SM-SP
		59-11791	56-66	C	109	12	-	-	-	-	-	-	100	99	82	26	9	91	5	4	-	NP	A-3(0)	SM-SP
T23N, R3E, Sec. 23; NE160, SE40, SE10 (coarser textured)	Terrace sands	59-11792	5-15	A1	114	12	-	-	-	-	-	100	91	86	43	16	14	86	8	6	-	NP	A-2-4(0)	SM
		59-11793	21-28	B2	115	12	-	100	100	99	97	93	76	73	29	8	6	94	4	2	-	NP	A-1-3(0)	SM-SP
		59-11794	28-38	C1	113	11	-	100	100	100	99	94	87	71	30	3	1	98	0	2	-	NP	A-1-6(0)	SP
PECATONICA SILT LOAM																								
T23N, R7E, Sec. 17; SW160, SE40, NW10, NW2½ (coarser textured till).	Loess on glacial till	59-11813	5-8	A22	108	16	-	-	-	-	-	-	100	99	99	97	96	4	76	20	25	4	A-4(8)	CL-ML
		59-11814	17-26	B2	110	18	-	-	100	100	100	100	98	97	97	88	86	14	51	35	36	17	A-6(11)	CL
		59-11815	26-40	IIB2	114	15	100	99	97	95	94	91	90	87	82	62	55	45	16	29	27	10	A-4(4)	CL
		59-11816	61-69	IIC	127	9	100	95	93	92	89	85	80	72	60	40	35	65	26	9	16	4	A-4(0)	SM
T23N, R5E, Sec. 8, NE160, SE40, NE10 (finer textured till).	Loess on glacial till	59-11817	0-4	A1	90	24	-	-	-	-	-	-	100	99	96	86	83	17	66	17	38	8	A-4(8)	OL
		59-11818	20-32	IIB22	109	17	100	100	100	100	99	98	97	95	88	67	57	43	23	34	35	17	A-6(7)	CL
		59-11819	53-59	IIC	117	15	-	100	99	98	98	96	95	93	89	75	68	32	39	29	26	8	A-4(7)	CL
NIOTA SILTY CLAY LOAM, CLAYEY SUBSURFACE VARIANT																								
T25N, R3E, Sec. 36; NE 160, NW40, NE10 (modal profile).	Lacustrine sediments	59-11795	0-9	Ap	78	28	-	-	-	-	-	-	100	99	98	97	96	4	35	61	60	23	A-7-5(17)	OH
		59-11796	9-17	B21g	80	34	-	-	-	-	-	-	100	100	99	98	98	2	9	89	76	40	A-7-5(20)	MH
		59-11797	42-62	C1	86	29	-	-	-	-	-	-	-	-	100	99	99	1	6	93	65	30	A-7-5(20)	MH
T25N, R3E, Sec. 25; SE160, SW40, SE10 (coarser textured C horizon).	Lacustrine sediments	59-11798	8-14	A12	84	32	-	-	-	-	-	-	100	99	95	93	92	8	36	56	51	14	A-7-6(12)	OH
		59-11799	19-31	B22g	74	42	-	-	-	-	-	-	100	100	99	99	99	1	5	94	91	52	A-7-5(20)	MH
		59-11800	46-60	C2	80	37	-	-	-	-	-	-	-	100	100	99	99	1	11	88	84	49	A-7-5(20)	CH
T25N, R4E, Sec. 31; SE160, NE40, SE10 (coarser textured C horizon).	Lacustrine sediments	59-11801	0-7	Ap	92	26	-	-	-	-	-	-	100	100	99	99	98	2	52	46	36	13	A-6(9)	CL
		59-11802	7-16	B21g	87	29	-	-	-	-	-	-	-	-	-	100	100	0	35	65	55	27	A-7-6(18)	CH
		59-11803	39-50	C1	96	23	-	-	-	-	-	-	100	100	99	99	98	2	57	41	49	29	A-7-6(18)	CL
SAWMILL SILTY CLAY LOAM																								
T23N, R4E, Sec. 31, NE160, NW40, SW10 (modal profile).	Alluvium	59-11776	0-18	A1	94	23	-	-	-	-	-	-	-	100	100	98	96	4	52	44	47	22	A-7-6(14)	CL
		59-11777	35-48	B22g	102	19	-	-	-	-	-	-	-	-	100	100	99	1	60	39	43	20	A-7-6(13)	CL
		59-11778	48-60	Cg	107	18	-	-	-	-	-	-	100	100	99	99	95	5	77	18	30	10	A-4(8)	CL
T23N, R4E, Sec 31; NE160, NW40 NE10 (coarser textured).	Alluvium	59-11779	8-16	A12	102	17	-	-	-	-	-	-	100	100	96	86	83	17	54	29	38	15	A-6(10)	CL
		59-11780	16-30	A13	99	19	-	-	-	-	-	-	-	100	99	97	95	5	60	35	43	21	A-7-6(13)	CL
		59-11781	30-46	B2g	104	18	-	-	-	-	-	-	-	-	100	99	97	3	65	32	37	17	A-6(11)	CL
		59-11782	46-58	Cg	123	17	-	-	-	-	-	-	100	100	99	98	96	3	68	29	34	15	A-6(10)	CL-
T23N, R4E, Sec. 31; NW160, NW40, NE10 (finer textured).	Alluvium	59-11783	4-8	A12	90	25	-	-	-	-	-	-	100	97	96	89	86	14	44	42	52	27	A-7-6(17)	CH
		59-11784	25-35	B22g	101	21	-	-	-	-	-	-	100	98	96	91	89	11	39	50	50	30	A-7-6(18)	CL
		59-11785	35-42	B3g	100	22	-	-	-	-	-	-	-	100	99	94	93	7	46	47	50	29	A-7-6(18)	CH
TAMA SILT LOAM																								
T24N, R6E, Sec. 24; SW160, SW40, SW10 (modal profile).	Loess	59-11804	0-13	A1	95	24	-	-	-	-	-	-	-	100	100	99	99	1	74	25	49	21	A-7-6(14)	CL
		59-11805	25-37	B22	103	18	-	-	-	-	-	-	-	-	100	100	100	0	60	40	39	18	A-6(11)	CL
		59-11806	56-66	C1	106	18	-	-	-	-	-	-	-	-	100	100	100	0	65	35	34	14	A-6(10)	CL
T24N, R4E, Sec. 13; SW160, NW40, NW10 (coarser textured B horizon).	Loess	59-11807	11-18	A12	99	22	-	-	-	-	-	-	-	100	100	100	99	1	69	30	35	16	A-6(10)	CL
		59-11808	33-44	B22	101	21	-	-	-	-	-	-	-	-	100	100	99	1	62	37	39	19	A-6(11)	CL
		59-11809	54-69	C1	106	18	-	-	-	-	-	-	-	-	100	98	97	3	69	28	33	11	A-6(9)	CL
T25N, R7E, Sec. 5; NE160, SE40, SW10 (finer textured B horizon).	Loess	59-11810	0-10	A1	89	25	-	-	-	-	-	-	100	100	99	99	98	2	68	30	41	14	A-7-6(10)	OL
		59-11811	33-43	B22	103	20	-	-	-	-	-	-	100	100	100	99	99	1	60	39	44	23	A-7-6(14)	CL
		59-11812	64-75	C	109	15	-	-	-	-	-	-	-	-	100	100	99	1	67	32	39	13	A-6(9)	ML

[a] Tests performed by Illinois Division of Highways, Bureau of Materials, Springfield, Illinois.

[b] Moisture density is based on the Moisture-Density Relations of Soils, using 5.5-lb. Rammer and 12-in. Drop, AASHO Designation T 99, Method A.

[c] Mechanical analyses according to the AASHO Designation T 88. Results by this procedure frequently may differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 mm. in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 mm. in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soils.

[d] AASHO classifications are based on Standard Specification for Highway Materials and Methods of Sampling and Testing (Pt. 1, Ed. 8): The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes, AASHO Designation M 145-49.

[e] Unified classifications are based on the Unified Soil Classification System, Technical Memorandum No. 3-357, Volume 1, Waterways Experiment Station, Corps of Engineers, March, 1953.

silt loams but vary in texture from silty clay loam to sandy loam.

CLIMATE

Climate is an important soil-forming factor because rainfall and temperature largely control the kind and degree of weathering which, in turn, greatly affect soil profiles and their properties. Climate is also largely responsible for the type of native vegetation that grew on the soils. The humid-temperate climate of Carroll County favors the weathering and reduction in size of soil minerals and the formation and movement of clay downward in the soil profile, especially where parent materials have been in place for a long period of time. The prevailing rainfall has also influenced the removal, through leaching, of some of the basic elements, replacing them with hydrogen. This process imparts varying degrees of acidity to horizons of the soil profiles.

PLANTS AND ANIMALS

The vegetation that grew in Carroll County prior to the time of settlement has been responsible for soil differences, especially through the accumulation of organic matter, which influences the surface soil color. The dark-colored soils developed under native prairie grasses; the light-colored soils developed where forests, dominated by oak and hickory trees, grew for long periods of time. Some soils developed under mixed grass and forest or were forested for a relatively short period of time before being cleared; these soils have moderately dark-colored surfaces with intermediate organic matter contents. The general soil map, page 137, shows areas of dark-colored soils by green-colored patterns and areas of light-colored soils, developed under forest, by red-colored patterns.

Animals that live on and in the soil have also influenced soil development but generally to a lesser extent than plants. The activities of man — clearing forests, cultivating, fertilizing, draining, irrigating, and excavating and filling — have changed the course of soil formation. These activities have been recent enough, however, that their effects on soil development are not yet very apparent. Over time this influence will become more significant.

TOPOGRAPHY AND DRAINAGE

Topography influences water infiltration and percolation, runoff, and erosion in a given area. The moisture status of most soils in a given climate is largely controlled by topography and drainage. Where soils are developed in uniform, permeable, medium-textured materials such as loess, natural drainage is closely related to slope. Well- and moderately well-drained soils occur on sloping areas, and somewhat poorly or poorly drained soils tend to occur on level areas or in depressions. In areas of very permeable sandy parent materials, well-drained soils may occur on all slopes, including level areas, unless there is a permanently high water table present. Conversely, poorly and somewhat poorly drained soils may occur on slopes in areas with slowly permeable parent materials such as shale bedrock, which has a high clay content.

Sloping land surfaces and permeable parent materials, which dominate the upland areas of Carroll County, are conducive to the development of well-drained soils with deep water tables. A few somewhat poorly and poorly drained soils occur in the uplands on level areas or in depressions and on slopes where soils are derived from shale, but most occur in level stream terrace areas or in the stream flood plains.

On steep slopes, rainfall tends to run off instead of passing through the soil profile. This fact, coupled with the removal of materials under natural conditions on steep slopes, results in the development of soils that have thin sola and weak profile development or horizonation.

TIME

The evaluation of the time factor in soil development and formation is difficult because of the combined influence of the other previously discussed factors of soil formation. The influence of time cannot be evaluated simply in years. A relatively "youthful" or slightly weathered soil and a relatively "old" or strongly weathered soil may develop in the same period of time if other factors of formation are quite different. If other formation factors are similar, however, then soils are usually more strongly developed or weathered and have greater horizon differentiation if they have been exposed to soil formation processes over a longer period of time.

The soils of Carroll County are relatively young. The most youthful and least differentiated are those that occur in stream flood plains, those that occur in bluff wash or colluvial material at the base of very steep slopes, and some of those that have developed on very steep slopes from a variety of parent materials. The soils derived primarily from loess in the upland or from materials on many stream terraces are related in age to relatively recent glacial events, and many are probably less than about 12,000 years old (*25*). The loess soils nearest the Mississippi River, about 2 to 8 miles from the bluffs, have developed from coarser textured and probably more recently deposited loess and are less developed than soils occurring further east from the loess source.

The age or time of effective weathering of soils derived partly or entirely from glacial drift and partly from bedrock on slopes is difficult to determine. In some areas Illinoian-age glacial drift or geologically older bedrock may have been weathering for many thousands of years before loess deposition. Strongly developed soils with thick sola may have developed in them. If these soils are covered by thin loess de-

posits, such as 1 to 4 feet thick, modern soils develop in the loess and the upper part of the older buried soils (paleosols). On other slopes, where glacial drift is also the parent material, erosion may have completely removed the old soils, and new soils may have developed which are the same age as those developed in thick loess parent material on more gentle slopes. Therefore, soils derived from glacial drift or bedrock on slopes may be old and highly weathered or relatively young, depending upon the erosional history of the respective slopes, both prior to and following loess deposition.

Soils are weathered and develop more rapidly in materials containing low rather than high amounts of carbonate, in permeable rather than slowly permeable materials, and under forest rather than grass vegetation. Such differences are not readily recognized by persons not trained in the science of soils, however.

Classification of the Soils

Soils are classified so we can see their relationship to one another, more easily remember their significant characteristics, assemble knowledge about them, and understand their behavior and response to the whole environment. Through classification and the preparation and use of soil maps, we can apply our knowledge of soils to individual tracts of land.

The current system used to classify soils was adopted for general use by the National Cooperative Soil Survey in 1965. After further study, evaluation, and some revisions, the classification system was published as *Soil Taxonomy* (preliminary text) in 1973 (*23*). Those readers interested in the development and details of this classification system should consult this publication.

Table 11 gives the classification of each soil series in Carroll County. The three land types and the variants and substratum phases of seven of the series are not included. The variants and substratum phases usually vary from the series in a minor, inconsequential way for most interpretations made for the soils.

The classification system defines classes in terms of observable or measurable properties of soils. The properties used are mainly those that permit the grouping of soils that are similar in their genesis. The system is designed to accommodate all known soils. Its six categories, beginning with the most inclusive, are the order, suborder, great group, subgroup, family, and series.

ORDER

The properties used to differentiate the soil orders are those that have resulted from similar processes acting to about the same degree, as indicated by the presence or absence of major diagnostic horizons. Ten classes of orders are recognized: Alfisols, Aridisols, Entisols, Histosols, Inceptisols, Mollisols, Oxisols, Spodosols, Ultisols, and Vertisols. The orders tend to give broad climatic groupings of soils, but the Entisols and Histosols occur in many different climates.

The five orders represented in Carroll County are Alfisols, Entisols, Histosols, Inceptisols, and Mollisols. Alfisols are soils that have clay-enriched B horizons, relatively high base saturation, and light-colored or thin surface horizons, named ochric epipedons. Entisols are very young soils that have no genetic horizons or only the beginning of horizons. Histosols are developed in materials very high in organic matter and have horizons or layers quite different from the mineral soils. Inceptisols occur on young, but not recent, land surfaces; although profile development is weak, they exhibit more development than the Entisols. Mollisols have thick, dark-colored surface layers (mollic epipedons) and usually have developed under grass vegetation; their surfaces have moderate to strong structure; base saturation in surface and subsurface horizons is high. Mollisols and Alfisols comprise the majority of soils in Carroll County.

SUBORDER

Each order is subdivided into suborders, primarily on the basis of characteristics that seem to produce classes having genetic similarity. The soil properties used to separate suborders are mainly those that reflect the presence or absence of wetness and the soil differences resulting from the climate or vegetation. The climatic range is narrower than that of the orders.

GREAT GROUP

Soil suborders are separated into great groups on the basis of uniformity in the kinds and sequence of major horizons and soil features. The horizons used as a basis for distinguishing between great groups are those in which clay, iron, or humus has accumulated or those that have pans that interfere with growth of roots or movement of water. Some of the features used are the self-mulching properties of clays, soil temperature, and chemical composition (mainly calcium, magnesium, sodium, and potassium content).

SUBGROUP

Great groups are divided into subgroups. One subgroup represents the central (typic) segment of this category. Other subgroups, called intergrades, have properties of one great group but also one or more properties of another great group, suborder, or order. Subgroups may also be established in instances where soil properties intergrade outside the range of any other great group, suborder, or order.

FAMILY

Families are established within a subgroup primarily on the basis of properties that affect the

TABLE 11. — CLASSIFICATION OF SOIL SERIES[a]

Soil Series	Family	Subgroup	Order
Ade	Coarse loamy, mixed, mesic	Psammentic Argiudoll	Mollisol
Argyle	Fine loamy, mixed, mesic	Mollic Hapludalf	Alfisol
Ashdale	Fine silty, mixed, mesic	Typic Argiudoll	Mollisol
Atterberry	Fine silty, mixed, mesic	Udollic Ochraqualf	Alfisol
Bloomfield	Coarse loamy, mixed, mesic	Psammentic Hapludalf	Alfisol
Camden	Fine silty, mixed, mesic	Typic Hapludalf	Alfisol
Casco	Fine loamy over sandy or sandy skeletal, mixed, mesic	Typic Hapludalf	Alfisol
Chute	Mixed, mesic	Typic Udipsamment	Entisol
Coatsburg	Fine, montmorillonitic, mesic, sloping	Typic Argiaquoll	Mollisol
Derinda	Fine, mixed, mesic	Typic Hapludalf	Alfisol
Dickinson	Coarse loamy, mixed, mesic	Typic Hapludoll	Mollisol
Dorchester	Fine silty, mixed, calcareous, mesic	Typic Udifluvent	Entisol
Downs	Fine silty, mixed, mesic	Mollic Hapludalf	Alfisol
Drummer	Fine silty, mixed, mesic	Typic Haplaquoll	Mollisol
Drury	Fine silty, mixed, mesic	Dystric Eutrochrept	Inceptisol
Dubuque	Fine silty, mixed, mesic	Typic Hapludalf	Alfisol
Dunbarton	Clayey, montmorillonitic, mesic	Lithic Hapludalf	Alfisol
Durand	Fine loamy, mixed, mesic	Typic Argiudoll	Mollisol
Edgington	Fine silty, mixed, mesic	Argiaquic Argialboll	Mollisol
Eleroy	Fine silty, mixed, mesic	Typic Hapludalf	Alfisol
Fayette	Fine silty, mixed, mesic	Typic Hapludalf	Alfisol
Flagg	Fine silty, mixed, mesic	Typic Hapludalf	Alfisol
Fox	Fine loamy over sandy or sandy skeletal, mixed, mesic	Typic Hapludalf	Alfisol
Gale	Fine silty over sandy or sandy skeletal, mixed, mesic	Typic Hapludalf	Alfisol
Gilford	Coarse loamy, mixed, mesic	Typic Haplaquoll	Mollisol
Hamburg	Coarse silty, mixed, calcareous, mesic	Typic Udorthent	Entisol
Hitt	Fine loamy, mixed, mesic	Typic Argiudoll	Mollisol
Hoopeston	Coarse loamy, mixed, mesic	Aquic Hapludoll	Mollisol
Huntsville	Fine silty, mixed, mesic	Cumulic Hapludoll	Mollisol
Joy	Fine silty, mixed, mesic	Aquic Hapludoll	Mollisol
Keltner	Fine silty, mixed, mesic	Typic Argiudoll	Mollisol
Lamont	Coarse loamy, mixed, mesic	Typic Hapludalf	Alfisol
Lawson	Fine silty, mixed, mesic	Cumulic Hapludoll	Mollisol
Lena	Euic, mesic	Typic Medisaprist	Histosol
Littleton	Fine silty, mixed, mesic	Cumulic Hapludoll	Mollisol
Loran	Fine silty, mixed, mesic	Aquic Argiudoll	Mollisol
Millington	Fine loamy, mixed, calcareous, mesic	Cumulic Haplaquoll	Mollisol
Mt. Carroll	Fine silty, mixed, mesic	Mollic Hapludalf	Alfisol
Muscatine [b]	Fine silty, mixed, mesic	Aquic Argiudoll	Mollisol
Myrtle	Fine silty, mixed, mesic	Mollic Hapludalf	Alfisol
Niota	Fine, mixed, mesic	Mollic Albaqualf	Alfisol
Ogle	Fine silty, mixed, mesic	Typic Argiudoll	Mollisol
Orion	Coarse silty, mixed, nonacid, mesic	Aquic Udifluvent	Entisol
Otter	Fine silty, mixed, mesic	Cumulic Haplaquoll	Mollisol
Palms	Loamy, mixed, euic, mesic	Terric Medisaprist	Histosol
Palsgrove	Fine silty, mixed, mesic	Typic Hapludalf	Alfisol
Pecatonica	Fine loamy, mixed, mesic	Typic Hapludalf	Alfisol
Plainfield	Mixed, mesic	Typic Udipsamment	Entisol
Port Byron	Fine silty, mixed, mesic	Typic Hapludoll	Mollisol
Rodman	Sandy skeletal, mixed, mesic	Typic Hapludoll	Mollisol

TABLE 11 (cont.).

Soil Series	Family	Subgroup	Order
Rozetta	Fine silty, mixed, mesic	Typic Hapludalf	Alfisol
Sable	Fine silty, mixed, mesic	Typic Haplaquoll	Mollisol
Sawmill	Fine silty, mixed, mesic	Cumulic Haplaquoll	Mollisol
Seaton	Fine silty, mixed, mesic	Typic Hapludalf	Alfisol
Selma	Fine loamy, mixed, mesic	Typic Haplaquoll	Mollisol
Sogn	Loamy, mixed, mesic	Lithic Haplustoll	Mollisol
Sparta	Sandy, mixed, mesic	Entic Hapludoll	Mollisol
Strawn	Fine loamy, mixed, mesic	Typic Hapludalf	Alfisol
Sylvan	Fine silty, mixed, mesic	Typic Hapludalf	Alfisol
Tama	Fine silty, mixed, mesic	Typic Argiudoll	Mollisol
Tell	Fine silty over sandy or sandy skeletal, mixed, mesic	Typic Hapludalf	Alfisol
Timula	Coarse silty, mixed, mesic	Typic Eutrochrept	Inceptisol
Wakeland	Coarse silty, mixed, nonacid, mesic	Aeric Fluvaquent	Entisol
Waukegan	Fine silty over sandy or sandy skeletal, mixed, mesic	Typic Hapludoll	Mollisol
Woodbine	Fine loamy, mixed, mesic	Typic Hapludalf	Alfisol
Worthen	Fine silty, mixed, mesic	Cumulic Hapludoll	Mollisol
Zwingle	Fine, montmorillonitic, mesic	Typic Albaqualf	Alfisol

[a] Not included in this table are the three land types (63, 455, and 577), five variants (511, 568, 574, 578, and 673), and two sandy substratum phases (562 and 563).

[b] The Muscatine series has recently been re-classified as an Aquic Hapludoll, but most of the areas mapped as Muscatine in Carroll County are believed to be Aquic Argiudolls.

growth of plants or behavior of soils when used for engineering. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence.

SERIES

The series category has the narrowest range of characteristics of the six categories of the classification system. The series is a group of soils that developed from a particular kind of parent material and have genetic horizons similar in differentiating characteristics and arrangement in the profile. These differentiating characteristics include morphological features such as color, structure, reaction, consistence, chemical and mineralogical composition, and kind, thickness, and arrangement of horizons. Texture is included in all horizons except the surface.

A particular series is quite uniform in its characteristics, and the differentiae used are differences that have been shown through experience or research to be important in influencing the kinds of statements that we can make about the behavior of the soil.

If genetic horizons are thin or absent, as in very youthful soils, series are uniform in their properties within a defined depth limit, usually the upper 40 inches.

LABORATORY DATA REFERENCES

Data on certain physical, chemical, and mineralogical properties of soils sampled in Carroll County, and data from soils sampled in other counties but applicable to soils in Carroll County, are available in various publications.

Data for Tama, Muscatine, Sable, Fayette, Rozetta, Stronghurst, Joy, and Seaton soils are given in Loess Soils of Northwest Illinois, Bulletin 739, University of Illinois Agricultural Experiment Station (*25*).

Data on Derinda, Eleroy, and Keltner soils are given in two papers, "Rooting Volume of Corn and Alfalfa in Shale-Influenced Soils in Northwestern Illinois" (*4*) and "Mineralogical and Chemical Characteristics of Soils in Loess Overlying Shale in Northwestern Illinois" (*10*).

Particle-size distribution and pH for one profile of Ogle, silt loam subsoil variant (referred to by a tentative name of Wacker) are published in "Character-

istics and Implications of a Thin Loess Area in Northwestern Illinois" in the Transactions of the Illinois State Academy of Science (*17*).

Data for representative profiles of Argyle, Ashdale, Ogle, Pecatonica, and Tama from Carroll or nearby counties are on file in graduate student theses or data books in the Department of Agronomy, University of Illinois at Urbana-Champaign.

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GLOSSARY

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates such as crumbs, blocks, or prisms are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available moisture capacity. The capacity of the soil to hold water that can be used by plants. Water held between the wilting point (15 atmospheres of tension) and the field capacity (1/3 atmosphere). In this publication classes of available moisture capacity to a depth of 60 inches are as follows:

Very high	12 inches or more
High	9 to 12 inches
Moderate	6 to 9 inches
Low	3 to 6 inches
Very low	less than 3 inches

Base saturation. The degree to which material that has base-exchange properties is saturated with exchangeable cations other than hydrogen, expressed as a percentage of the cation-exchange capacity.

Bottomland. Nearly level land on the bottom of a valley that has a stream flowing through it. Subject to flooding and often referred to as a flood plain.

Calcareous soil. A soil that contains enough calcium carbonate (often with magnesium carbonate) to effervesce (fizz) when treated with cold, dilute hydrochloric acid.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of clay on the surface of a soil aggregate. Synonyms: clay coat, clay skin.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds or of soil grains cemented together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose — Noncoherent when dry or moist; does not hold together in a mass.

Friable — When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm — When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic — When wet, readily deformed by moderate pressure, but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky — When wet, adheres to other material and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard — When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft — When dry, breaks into powder or individual grains under very slight pressure.

Cemented — Hard and brittle; little affected by moistening.

Contour farming. Conducting field operations such as plowing, planting, cultivating, and harvesting in rows that are at right angles to the natural direction of the slope and are as nearly level as practical.

Contour stripcropping. Growing crops in strips that follow the land contour or are parallel to terraces or diversions; strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Cover crops. Close-growing crops, grown primarily to improve the soil and protect it between periods of regular crop production or grown between trees in orchards.

Crop residue. The part of a plant, or crop, left in the field after harvest.

Depth of soil. Thickness of soil over a specified layer, generally a layer that does not permit growth of roots. Classes used in this survey are as follows:

Deep	36 inches or more
Moderately deep	20 to 36 inches
Shallow	10 to 20 inches
Very shallow	less than 10 inches

Diversion, or diversion terrace. A ridge of earth, generally a terrace, that is built to divert runoff from its natural course and, thus, to protect downslope areas from the effects of such runoff.

Drainage, natural soil. Refers to the frequency and duration of periods of saturation or partial saturation that existed during the development of the soil; as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained soils are commonly very porous and rapidly permeable and have a low available water capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well-drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and have mottling in the lower B and C horizons.

Somewhat poorly drained soils are wet for significant periods but not all the time, and in the forested, light-colored soils commonly are mottled below a depth of 6 to 16 inches, in the lower A horizon, and in the B and C horizons.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents. For detailed description of erosion terms, see page 1.

Glacial outwash. Cross-bedded gravel, sand, and silt deposited by melt water as it flowed from glacial ice.

Glacial till. Unstratified glacial drift that consists of clay, silt, sand, gravel, and boulders transported and deposited by glacial ice.

Gleyed soil. A soil in which waterlogging and lack of oxygen have caused the material in one or more horizons to be neutral gray in color. The term "gleyed" is applied to soil horizons with yellow and gray mottling caused by intermittent waterlogging.

Grassed waterway. A natural or constructed waterway, typically broad and shallow and covered by grass for protection against erosion; used to conduct surface water away from cropland.

Green-manure crop. A crop of grasses or legumes worked into the soil while green or soon after maturity to improve soil.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon — The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon — The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active; it is marked, therefore, by the accumulation of humus. The horizon may have lost some combination of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon — The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizons; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon — The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer — Consolidated rock beneath the soil. The rock usually underlies a C horizon, but may be immediately beneath an A or B horizon.

Intake rate. The rate of entry of water into the soil, usually expressed in inches per hour. In this survey three intake rate classes are used: (1) rapid, more than 1.5 inches per hour; (2) medium, 1.0 to 1.5 inches per hour; and (3) slow, less than 1.0 inch per hour. These rates apply to the upper 18 inches of soil where it is unsaturated and where the surface is covered by vegetation.

Lacustrine deposits. Materials deposited in the waters of lakes and exposed by the lowering of the water level or by the elevation of the land.

Land type. A mapping unit for areas of land that have little or no natural soil or are too nearly inaccessible for orderly examination or that occur where, for other reasons, it is not feasible to classify the soil.

Leached soil. A soil from which most of the soluble constituents have been removed throughout the

entire profile or removed from one part of the profile and accumulated in another part.

Loess. A uniform, silty material transported by wind and deposited on the land.

Mottled. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: abundance — *few, common,* and *many*; size — *fine, medium,* and *coarse;* and contrast — *faint, distinct,* and *prominent.* The size measurements are these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimensions; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimensions; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Munsell notation. A system for designating color by degrees of the three simple variables — hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with a hue of 10YR, a value of 6, and a chroma of 4.

Organic matter content. Ratings used in this report have the following general limits: very low — below 1 percent of volume; low — 1 to 2 percent of volume; moderately low — 2 to 3 percent; moderate — 3 to 4 percent; and high — more than 4 percent. The two Histosols (organic soils) are rated very high.

Paleosols. Soils that are older than many of the associated soils in the same general area or present landscape and that were originally on the surface of preexisting landscapes. A common example as used in this report is the soil or weathered zone developed in Illinoian-age drift, which in many places was buried beneath much younger Peoria (Woodfordian-age) Loess. In some places, the Illinoian drift paleosol is buried deeply beneath several feet of loess in which a much younger, modern soil has developed. In other places, where loess is less than about 4 or 5 feet thick, the modern soil is developed in both the younger loess and the upper part of the buried soil or paleosol. Some paleosols that were buried for a time may have been completely exhumed by erosion and occupy the landscape surface again.

Permeability, soil. The quality of a soil that enables it to transmit air and water. The following relative classes of soil permeability used in this soil survey refer to estimated rates of movement of water in inches per hour:

Very slow	less than 0.06
Slow	0.06-0.2
Moderately slow	0.2-0.6
Moderate	0.6-2.0
Moderately rapid	2.0-6.0
Rapid	6.0-20.0

Phase, soil. A subdivision of a soil series or other unit in the soil classification system made because of differences in the soil that affect its management but do not affect its classification in the natural landscape. A soil series, for example, may be divided into phases because of differences in slope, stoniness, thickness, or some other characteristic that affects its management but not its behavior in the natural landscape.

Profile, soil. A vertical section of the soil through all its horizons and extending into the substratum.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that has a pH value of 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed as follows:

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Sand. Individual rock or mineral fragments having diameters ranging from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be any mineral composition. Also, the textural class name of a soil that contains 85 percent or more sand and not more than 10 percent clay.

Series, soil. A group of soils that developed from a particular type of parent material and, except for texture of the surface layer, have genetic horizons that are similar in differentiating characteristics and in arrangement in the profile.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate

and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plants and animal life characteristic of the soil are largely confined to the solum. The plural of solum is sola.

Stratified. Composed of or arranged in strata, or layers, such as stratified alluvium. The term is confined to geological materials. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are *platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are (1) *single grained* (each grain by itself, as in dune sand) or (2) *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subgrade material. The prepared and compacted soil material below the road pavement; called the "basement soil."

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically, the part of the soil below the solum.

Subsurface layer. The horizon between the surface layer and the subsoil. Generally, the A2 horizon.

Surface layer. A nontechnical term used for one or more layers above the subsoil. Includes the A horizon and, in places, part of the B horizon; has no depth limit.

Terrace (geological). An old alluvial plain, ordinarily flat or undulating, bordering a river, lake, or the sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the seas and are generally wide.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high, noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Upland. Land consisting of material unworked by water in recent geologic time and lying, in general, at a higher elevation than the alluvial plain or stream terrace. Land above the lowland along rivers.

Variant. A soil that has many characteristics of the series in which it is placed but differing in at least one important characteristic, indicated by its name. The acreage of a variant is too small in extent to justify establishing a new series. A new series may be designated and replace the variant, however, if sufficient acreage is later found.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

Weathering. The physical and chemical disintegration and decomposition of rocks and minerals. Soil is the result of weathering and other chemical, physical, and biological alterations that have changed the upper part of the earth's crust through various periods of time.

GUIDE TO MAPPING UNITS

This guide indicates the capability unit (management group) for individual mapping units, the group symbols or numbers for individual mapping units in various interpretative tables, and the page numbers for the series descriptions. Mapping unit information can be found in tables as indicated:

Predicted yields and acreage, Table 4 (pages 71-78).
Woodland groups, Table 5 (pages 80-83).
Wildlife groups, Table 6 (pages 85-86).
Recreation groups, Table 7 (pages 86-87).
Engineering uses of the soils, Table 8 (pages 89-95), Table 9 (pages 98-119), and Table 10 (page 121).

Map symbol	Mapping unit	Description	Capability unit		Woodland group	Wildlife group	Recreation group
		Page	Symbol	Page			
19E3	Sylvan soils, 12- to 18-percent slopes, severely eroded	53	VIe-1	67	2r2	2	4
19F2	Sylvan silt loam, 18- to 30-percent slopes, moderately eroded	53	VIe-1	67	2r2	3	4
19F3	Sylvan soils, 18- to 30-percent slopes, severely eroded	53	VIe-1	67	2r2	3	4
19G2	Sylvan silt loam, 30- to 60-percent slopes, moderately eroded	53	VIIe-1	68	3r3	3	4
19G3	Sylvan soils, 30- to 60-percent slopes, severely eroded	53	VIIe-1	68	3r3	3	4
21B	Pecatonica silt loam, 2- to 4-percent slopes	46	IIe-1	61	2o1	1	1
21C	Pecatonica silt loam, 4- to 7-percent slopes	46	IIe-1	61	2o1	1	1
21C2	Pecatonica silt loam, 4- to 7-percent slopes, moderately eroded	46	IIe-1	61	2o1	1	1
21C3	Pecatonica soils, 4- to 7-percent slopes, severely eroded	46	IIIe-1	63	2o1	1	1
21D	Pecatonica silt loam, 7- to 12-percent slopes	46	IIIe-1	63	2o1	1	3
21D2	Pecatonica silt loam, 7- to 12-percent slopes, moderately eroded	46	IIIe-1	63	2o1	1	3
21D3	Pecatonica soils, 7- to 12-percent slopes, severely eroded	46	IVe-1	65	2o1	1	3
21E	Pecatonica silt loam, 12- to 18-percent slopes	46	IVe-1	65	2r2	2	4
21E2	Pecatonica silt loam, 12- to 18-percent slopes, moderately eroded	46	IVe-1	65	2r2	2	4
21E3	Pecatonica soils, 12- to 18-percent slopes, severely eroded	46	VIe-1	67	2r2	2	4
21F	Pecatonica silt loam, 18- to 30-percent slopes	46	VIe-1	67	2r2	3	4
21F2	Pecatonica silt loam, 18- to 30-percent slopes, moderately eroded	46	VIe-1	67	2r2	3	4
21F3	Pecatonica soils, 18- to 30-percent slopes, severely eroded	46	VIe-1	67	2r2	3	4
30D2[a]	Hamburg silt loam, 7- to 12-percent slopes	33	IIIe-1	63	2o1	7	3
30F2[a]	Hamburg silt loam, 18- to 30-percent slopes	33	VIe-1	67	2r2	7	4
30G2[a]	Hamburg silt loam, 30- to 60-percent slopes	33	VIIe-1	68	3r3	7	4
36A	Tama silt loam, 0- to 2-percent slopes	54	I-1	60	1o1	1	1
36B	Tama silt loam, 2- to 4-percent slopes	54	IIe-1	61	1o1	1	1
36B2	Tama silt loam, 2- to 4-percent slopes, moderately eroded	54	IIe-1	61	1o1	1	1
36C	Tama silt loam, 4- to 7-percent slopes	54	IIe-1	61	1o1	1	1
36C2	Tama silt loam, 4- to 7-percent slopes, moderately eroded	54	IIe-1	61	1o1	1	1
36C3	Tama silt loam, 4- to 7-percent slopes, severely eroded	54	IIIe-1	63	1o1	1	1
36D	Tama silt loam, 7- to 12-percent slopes	54	IIIe-1	63	1o1	1	3
36D2	Tama silt loam, 7- to 12-percent slopes, moderately eroded	54	IIIe-1	63	1o1	1	3
36D3	Tama silt loam, 7- to 12-percent slopes, severely eroded	54	IVe-1	65	1o1	1	3
36E2	Tama silt loam, 12- to 18-percent slopes, moderately eroded	54	IVe-1	65	1r2	2	4
36E3	Tama silt loam, 12- to 18-percent slopes, severely eroded	54	VIe-1	67	1r2	2	4
37A	Worthen silt loam, 0- to 2-percent slopes	57	I-1	60	1o1	1	1
37B	Worthen silt loam, 2- to 4-percent slopes	57	IIe-1	61	1o1	1	1
37C	Worthen silt loam, 4- to 7-percent slopes	57	IIe-1	61	1o1	1	1
37D2	Worthen silt loam, 7- to 12-percent slopes, moderately eroded	57	IIIe-1	63	1o1	1	3
41A	Muscatine silt loam, 0- to 2-percent slopes	40	I-2	60	2o1	4	5
41B	Muscatine silt loam, 2- to 4-percent slopes	40	IIe-2	61	2o1	4	5
53B	Bloomfield fine sand, 2- to 4-percent slopes	21	IVs-1	66	3s2	7	2
53D	Bloomfield fine sand, 7- to 12-percent slopes	21	VIs-1	68	3s2	7	3
53F	Bloomfield fine sand, 18- to 30-percent slopes	21	VIIs-1	69	3s3	7	4
54B	Plainfield sand, 2- to 4-percent slopes	47	VIIs-1	69	4s2	7	2
54C3	Plainfield sand, 4- to 7-percent slopes, severely wind-eroded	47	VIIs-1	69	4s2	7	3
54F2[a]	Plainfield sand, 18- to 30-percent slopes	47	VIIs-1	69	4s2	7	4
61A	Atterberry silt loam, 0- to 2-percent slopes	21	I-2	60	3o1	4	5
61B	Atterberry silt loam, 2- to 4-percent slopes	21	IIe-2	61	3o1	4	5
63	Blown-Out Land	22	VIIs-1	69	4s2	7	2
68	Sable silty clay loam	49	IIw-1	62	2w3	6	7
68+	Sable silt loam, overwash	49	IIw-1	62	2w3	6	7
75B	Drury silt loam, 2- to 4-percent slopes	27	IIe-1	61	1o1	1	1
75C	Drury silt loam, 4- to 7- percent slopes	27	IIe-1	61	1o1	1	1
75C2	Drury silt loam, 4- to 7-percent slopes, moderately eroded	27	IIe-1	61	1o1	1	1
75D2	Drury silt loam, 7- to 12-percent slopes, moderately eroded	27	IIIe-1	63	1o1	1	3
75E2	Drury silt loam, 12- to 18-percent slopes, moderately eroded	27	IVe-1	65	1r2	2	4
75F2	Drury silt loam, 18- to 30-percent slopes, moderately eroded	27	VIe-1	67	1r2	3	4

[a] The erosion symbol (2) for these mapping units is used mainly to indicate that these soils have thin surface horizons as the result of normal soil development; no statement of degree of erosion is implied.

GUIDE TO MAPPING UNITS (cont.)

Map symbol	Mapping unit	Description	Capability unit		Woodland group	Wildlife group	Recreation group
		Page	Symbol	Page			
76	Otter silt loam	45	IIw-1	62	2w5	6	8
$\overline{76}$	Otter silt loam, wet	45	Vw-1	67	2w5	6	8
77	Huntsville silt loam	35	I-1	60	1o4	5	6
81A	Littleton silt loam, 0- to 2-percent slopes	38	I-2	60	2o1	4	5
81B	Littleton silt loam, 2- to 4-percent slopes	38	IIe-2	61	2o1	4	5
81C	Littleton silt loam, 4- to 7-percent slopes	38	IIe-2	61	2o1	4	5
82	Millington silt loam	39	IIw-1	62	2w5	6	8
$\overline{82}$	Millington silt loam, wet	39	Vw-1	67	2w5	6	8
87A	Dickinson sandy loam, 0- to 2-percent slopes	24	IIIs-1	65	3s2	7	2
87B	Dickinson sandy loam, 2- to 4-percent slopes	24	IIIs-1	65	3s2	7	2
87C	Dickinson sandy loam, 4- to 7-percent slopes	24	IIIe-2	63	3s2	7	3
87C2	Dickinson sandy loam, 4- to 7-percent slopes, moderately eroded	24	IIIe-2	63	3s2	7	3
87E2	Dickinson sandy loam, 12- to 18-percent slopes, moderately eroded	24	IVe-2	66	3s3	7	4
88A	Sparta loamy sand, 0- to 2-percent slopes	52	IVs-1	66	4s2	7	2
88B	Sparta loamy sand, 2- to 4-percent slopes	52	IVs-1	66	4s2	7	2
88C	Sparta loamy sand, 4- to 7-percent slopes	52	IVs-1	66	4s2	7	3
88C2	Sparta loamy sand, 4- to 7-percent slopes, moderately eroded	52	IVs-1	66	4s2	7	3
88D	Sparta loamy sand, 7- to 12-percent slopes	52	VIs-1	68	4s2	7	3
88E	Sparta loamy sand, 12- to 18-percent slopes	52	VIIs-1	69	4s2	7	4
93E2	Rodman gravelly loam, 12- to 18-percent slopes, moderately eroded	48	VIs-1	68	3s3	7	4
98A	Ade loamy fine sand, 0- to 2-percent slopes	16	IIIs-1	65	4s2	7	2
98B	Ade loamy fine sand, 2- to 4-percent slopes	16	IIIs-1	65	4s2	7	2
98C	Ade loamy fine sand, 4- to 7-percent slopes	16	IIIe-2	63	4s2	7	3
98D	Ade loamy fine sand, 7- to 12-percent slopes	16	IIIe-2	63	4s2	7	3
100	Palms muck	45	IIIw-2	64	2w5	6	8
$\overline{100}$	Palms muck, wet	45	Vw-1	67	2w5	6	8
107	Sawmill silty clay loam	50	IIw-1	62	2w5	6	8
$\overline{107}$	Sawmill silty clay loam, wet	50	Vw-1	67	2w5	6	8
107+	Sawmill silt loam, overwash	50	IIw-1	62	2w5	6	8
125	Selma loam	51	IIw-1	62	2w3	6	7
134A	Camden silt loam, 0- to 2-percent slopes	22	I-1	60	1o1	1	1
134B	Camden silt loam, 2- to 4-percent slopes	22	IIe-1	61	1o1	1	1
134C	Camden silt loam, 4- to 7-percent slopes	22	IIe-1	61	1o1	1	1
134C2	Camden silt loam, 4- to 7-percent slopes, moderately eroded	22	IIe-1	61	1o1	1	1
134D2	Camden silt loam, 7- to 12-percent slopes, moderately eroded	22	IIIe-1	63	1o1	1	3
134E2	Camden silt loam, 12- to 18-percent slopes, moderately eroded	22	IVe-1	65	1r2	2	4
152	Drummer silty clay loam	26	IIw-1	62	2w3	6	7
172	Hoopeston sandy loam	34	IIw-2	62	3o1	4	5
175B	Lamont fine sandy loam, 2- to 4-percent slopes	36	IIIs-1	65	3s2	7	2
175C	Lamont fine sandy loam, 4- to 7-percent slopes	36	IIIe-2	63	3s2	7	3
175C2	Lamont fine sandy loam, 4- to 7-percent slopes, moderately eroded	36	IIIe-2	63	3s2	7	3
175D	Lamont fine sandy loam, 7- to 12-percent slopes	36	IIIe-2	63	3s2	7	3
175D2	Lamont fine sandy loam, 7- to 12-percent slopes, moderately eroded	36	IIIe-2	63	3s2	7	3
175D3	Lamont fine sandy loam, 7- to 12-percent slopes, severely eroded	36	IVe-2	66	3s2	7	3
175E2	Lamont fine sandy loam, 12- to 18-percent slopes, moderately eroded	36	IVe-2	66	3s3	7	4
175E3	Lamont fine sandy loam, 12- to 18-percent slopes, severely eroded	36	VIe-2	67	3s3	7	4
175F2	Lamont fine sandy loam, 18- to 30-percent slopes, moderately eroded	36	VIe-2	67	3s3	7	4
175F3	Lamont fine sandy loam, 18- to 30-percent slopes, severely eroded	36	VIIe-2	68	3s3	7	4
201	Gilford fine sandy loam	33	IIw-2	62	2w5	6	7
210	Lena muck	37	IIIw-2	64	2w5	6	8
$\overline{210}$	Lena muck, wet	37	Vw-1	67	2w5	6	8
224C2	Strawn silt loam, 4- to 7-percent slopes, moderately eroded	53	IIe-1	61	2o1	1	1
224D2	Strawn silt loam, 7- to 12-percent slopes, moderately eroded	53	IIIe-1	63	2o1	1	3
224E2	Strawn silt loam, 12- to 18-percent slopes, moderately eroded	53	IVe-1	65	2r2	2	4
224E3	Strawn soils, 12- to 18-percent slopes, severely eroded	53	VIe-1	67	2r2	2	4
224F2	Strawn silt loam, 18- to 30-percent slopes, moderately eroded	53	VIe-1	67	2r2	3	4
224F3	Strawn soils, 18- to 30-percent slopes, severely eroded	53	VIe-1	67	2r2	3	4
227B	Argyle silt loam, 2- to 4-percent slopes	20	IIe-1	61	2o1	1	1
227C	Argyle silt loam, 4- to 7-percent slopes	20	IIe-1	61	2o1	1	1
227C2	Argyle silt loam, 4- to 7-percent slopes, moderately eroded	20	IIe-1	61	2o1	1	1
227D2	Argyle silt loam, 7- to 12-percent slopes, moderately eroded	20	IIIe-1	63	2o1	1	3
227E2	Argyle silt loam, 12- to 18-percent slopes, moderately eroded	20	IVe-1	65	2r2	2	4

GUIDE TO MAPPING UNITS (cont.)

Map symbol	Mapping unit	Description	Capability unit		Woodland group	Wildlife group	Recreation group
		Page	Symbol	Page			
237	Hoopeston loam	34	IIw-2	62	3o1	4	5
237+	Hoopeston silt loam, overwash	34	IIw-2	62	3o1	4	5
$\overline{237}$	Hoopeston loam, wet	34	Vw-1	67	2w5	6	8
239A	Dorchester silt loam, 0- to 2-percent slopes	25	I-2	60	1o4	5	6
$\overline{239}$A	Dorchester silt loam, 0- to 2-percent slopes, wet	25	Vw-1	67	2w5	6	8
239B	Dorchester silt loam, 2- to 4-percent slopes	25	IIe-2	61	1o4	5	6
261	Niota silt loam	42	IIIw-1	64	3w2	6	7
268B	Mt. Carroll silt loam, 2- to 4-percent slopes	40	IIe-1	61	2o1	1	1
268C	Mt. Carroll silt loam, 4- to 7-percent slopes	40	IIe-1	61	2o1	1	1
268C2	Mt. Carroll silt loam, 4- to 7-percent slopes, moderately eroded	40	IIe-1	61	2o1	1	1
268D2	Mt. Carroll silt loam, 7- to 12-percent slopes, moderately eroded	40	IIIe-1	63	2o1	1	3
271E2	Timula silt loam, 12- to 18-percent slopes, moderately eroded	55	IVe-1	65	3r2	2	4
271F2	Timula silt loam, 18- to 30-percent slopes, moderately eroded	55	VIe-1	67	3r2	3	4
271G2	Timula silt loam, 30- to 60-percent slopes, moderately eroded	55	VIIe-1	68	3r3	3	4
272	Edgington silt loam	29	IIw-1	62	3w2	6	7
272+	Edgington silt loam, overwash	29	IIw-1	62	3w2	6	7
274B	Seaton silt loam, 2- to 4-percent slopes	50	IIe-1	61	2o1	1	1
274C	Seaton silt loam, 4- to 7-percent slopes	50	IIe-1	61	2o1	1	1
274D	Seaton silt loam, 7- to 12-percent slopes	50	IIIe-1	63	2o1	1	3
274D2	Seaton silt loam, 7- to 12-percent slopes, moderately eroded	50	IIIe-1	63	2o1	1	3
274D3	Seaton silt loam, 7- to 12-percent slopes, severely eroded	50	IIIe-1	63	2o1	1	3
274E	Seaton silt loam, 12- to 18-percent slopes	50	IVe-1	65	2r2	2	4
274E2	Seaton silt loam, 12- to 18-percent slopes, moderately eroded	50	IVe-1	65	2r2	2	4
274E3	Seaton silt loam, 12- to 18-percent slopes, severely eroded	50	IVe-1	65	2r2	2	4
274F	Seaton silt loam, 18- to 30-percent slopes	50	VIe-1	67	2r2	3	4
274F2	Seaton silt loam, 18- to 30-percent slopes, moderately eroded	50	VIe-1	67	2r2	3	4
274F3	Seaton silt loam, 18- to 30-percent slopes, severely eroded	50	VIe-1	67	2r2	3	4
274G2	Seaton silt loam, 30- to 60-percent slopes, moderately eroded	50	VIIe-1	68	3r3	3	4
275A	Joy silt loam, 0- to 2-percent slopes	35	I-1	60	2o1	4	5
275B	Joy silt loam, 2- to 4-percent slopes	35	IIe-1	61	2o1	4	5
277A	Port Byron silt loam, 0- to 2-percent slopes	47	I-1	60	1o1	1	1
277B	Port Byron silt loam, 2- to 4-percent slopes	47	IIe-1	61	1o1	1	1
277C	Port Byron silt loam, 4- to 7-percent slopes	47	IIe-1	61	1o1	1	1
277C2	Port Byron silt loam, 4- to 7-percent slopes, moderately eroded	47	IIe-1	61	1o1	1	1
277D	Port Byron silt loam, 7- to 12-percent slopes	47	IIIe-1	63	1o1	1	3
277D2	Port Byron silt loam, 7- to 12-percent slopes, moderately eroded	47	IIIe-1	63	1o1	1	3
277D3	Port Byron silt loam, 7- to 12-percent slopes, severely eroded	47	IIIe-1	63	1o1	1	3
279A	Rozetta silt loam, 0- to 2-percent slopes	49	I-1	60	2o1	1	1
279B	Rozetta silt loam, 2- to 4-percent slopes	49	IIe-1	61	2o1	1	1
279C	Rozetta silt loam, 4- to 7-percent slopes	49	IIe-1	61	2o1	1	1
280B	Fayette silt loam, 2- to 4-percent slopes	31	IIe-1	61	2o1	1	1
280B2	Fayette silt loam, 2- to 4-percent slopes, moderately eroded	31	IIe-1	61	2o1	1	1
280C	Fayette silt loam, 4- to 7-percent slopes	31	IIe-1	61	2o1	1	1
280C2	Fayette silt loam, 4- to 7-percent slopes, moderately eroded	31	IIe-1	61	2o1	1	1
280D	Fayette silt loam, 7- to 12-percent slopes	31	IIIe-1	63	2o1	1	3
280D2	Fayette silt loam, 7- to 12-percent slopes, moderately eroded	31	IIIe-1	63	2o1	1	3
280D3	Fayette soils, 7- to 12-percent slopes, severely eroded	31	IVe-1	65	2o1	1	3
280E	Fayette silt loam, 12- to 18-percent slopes	31	IVe-1	65	2r2	2	4
280E2	Fayette silt loam, 12- to 18-percent slopes, moderately eroded	31	IVe-1	65	2r2	2	4
280E3	Fayette soils, 12- to 18 percent slopes, severely eroded	31	VIe-1	67	2r2	2	4
280F	Fayette silt loam, 18- to 30-percent slopes	31	VIe-1	67	2r2	3	4
280F2	Fayette silt loam, 18- to 30-percent slopes, moderately eroded	31	VIe-1	67	2r2	3	4
280F3	Fayette soils, 18- to 30-percent slopes, severely eroded	31	VIe-1	67	2r2	3	4
280G	Fayette silt loam, 30- to 60-percent slopes	31	VIIe-1	68	3r3	3	4
280G2	Fayette silt loam, 30- to 60-percent slopes, moderately eroded	31	VIIe-1	68	3r3	3	4
282E3	Chute fine sand, 12- to 18-percent slopes, severely eroded	23	VIIs-1	69	4s2	7	4
282F3	Chute fine sand, 18- to 30-percent slopes, severely eroded	23	VIIs-1	69	4s2	7	4
333	Wakeland silt loam	56	I-2	60	2o4	5	6
386A	Downs silt loam, 0- to 2-percent slopes	26	I-1	60	2o1	1	1
386B	Downs silt loam, 2- to 4-percent slopes	26	IIe-1	61	2o1	1	1
386C	Downs silt loam, 4- to 7-percent slopes	26	IIe-1	61	2o1	1	1
386C2	Downs silt loam, 4- to 7-percent slopes, moderately eroded	26	IIe-1	61	2o1	1	1
386D	Downs silt loam, 7- to 12-percent slopes	26	IIIe-1	63	2o1	1	3
386D2	Downs silt loam, 7- to 12-percent slopes, moderately eroded	26	IIIe-1	63	2o1	1	3
386E	Downs silt loam, 12- to 18-percent slopes	26	IVe-1	65	2r2	2	4
386E2	Downs silt loam, 12- to 18-percent slopes, moderately eroded	26	IVe-1	65	2r2	2	4

GUIDE TO MAPPING UNITS (cont.)

Map symbol	Mapping unit	Description Page	Capability unit Symbol	Capability unit Page	Woodland group	Wildlife group	Recreation group
411B	Ashdale silt loam, 2- to 4-percent slopes	20	IIe-1	61	3o1	1	1
411C2	Ashdale silt loam, 4- to 7-percent slopes, moderately eroded	20	IIe-1	61	3o1	1	1
411D2	Ashdale silt loam, 7- to 12-percent slopes, moderately eroded	20	IIIe-1	63	3o1	1	3
411E3	Ashdale silt loam, 12- to 18-percent slopes, severely eroded	20	VIe-1	67	3r2	2	4
412C	Ogle silt loam, 4- to 7-percent slopes	43	IIe-1	61	2o1	1	1
412C2	Ogle silt loam, 4- to 7-percent slopes, moderately eroded	43	IIe-1	61	2o1	1	1
412D2	Ogle silt loam, 7- to 12-percent slopes, moderately eroded	43	IIIe-1	63	2o1	1	3
412D3	Ogle soils, 7- to 12-percent slopes, severely eroded	43	IVe-1	65	2o1	1	3
412E2	Ogle silt loam, 12- to 18-percent slopes, moderately eroded	43	IVe-1	65	2r2	2	4
413D2	Gale silt loam, 7- to 12-percent slopes, moderately eroded	32	IIIe-1	63	3o1	7	3
413F2	Gale silt loam, 18- to 30-percent slopes, moderately eroded	32	VIe-1	67	3r2	7	4
414B	Myrtle silt loam, 2- to 4-percent slopes	41	IIe-1	61	2o1	1	1
414C	Myrtle silt loam, 4- to 7-percent slopes	41	IIe-1	61	2o1	1	1
414C2	Myrtle silt loam, 4- to 7-percent slopes, moderately eroded	41	IIe-1	61	2o1	1	1
414D2	Myrtle silt loam, 7- to 12-percent slopes, moderately eroded	41	IIIe-1	63	2o1	1	3
415	Orion silt loam	44	I-2	60	2o4	5	6
416C	Durand silt loam, 4- to 7-percent slopes	29	IIe-1	61	2o1	1	1
416C2	Durand silt loam, 4- to 7-percent slopes, moderately eroded	29	IIe-1	61	2o1	1	1
416D2	Durand silt loam, 7- to 12-percent slopes, moderately eroded	29	IIIe-1	63	2o1	1	3
416D3	Durand soils, 7- to 12-percent slopes, severely eroded	29	IVe-1	65	2o1	1	3
416E2	Durand silt loam, 12- to 18-percent slopes, moderately eroded	29	IVe-1	65	2r2	2	4
416E3	Durand soils, 12- to 18-percent slopes, severely eroded	29	VIe-1	67	2r2	2	4
419B	Flagg silt loam, 2- to 4-percent slopes	31	IIe-1	61	2o1	1	1
419C	Flagg silt loam, 4- to 7-percent slopes	31	IIe-1	61	2o1	1	1
419C2	Flagg silt loam, 4- to 7-percent slopes, moderately eroded	31	IIe-1	61	2o1	1	1
419D	Flagg silt loam, 7- to 12-percent slopes	31	IIIe-1	63	2o1	1	3
419D2	Flagg silt loam, 7- to 12-percent slopes, moderately eroded	31	IIIe-1	63	2o1	1	3
419D3	Flagg soils, 7- to 12-percent slopes, severely eroded	31	IVe-1	65	2o1	1	3
419E2	Flagg silt loam, 12- to 18-percent slopes, moderately eroded	31	IVe-1	65	2r2	2	4
419E3	Flagg soils, 12- to 18-percent slopes, severely eroded	31	VIe-1	67	2r2	2	4
451	Lawson silt loam	37	I-2	60	2o4	5	6
$\overline{451}$	Lawson silt loam, wet	37	Vw-1	67	2w5	6	8
455	Mixed Alluvial Land	39	VIIw-1	69	2o4	5	6
504E2[a]	Sogn silt loam, 12- to 30-percent slopes	52	VIs-1	68	3s3	7	4
504G2[a]	Sogn silt loam, 30- to 60-percent slopes	52	VIIs-1	69	3r3	7	4
505D2	Dunbarton silt loam, 7- to 12-percent slopes, moderately eroded	28	IVe-2	66	3o1	7	3
505D3	Dunbarton soils, 7- to 12-percent slopes, severely eroded	28	VIe-2	67	3o1	7	3
505E	Dunbarton silt loam, 12- to 18-percent slopes	28	VIe-2	67	3r2	7	4
505E2	Dunbarton silt loam, 12- to 18-percent slopes, moderately eroded	28	VIe-2	67	3r2	7	4
505E3	Dunbarton soils, 12- to 18-percent slopes, severely eroded	28	VIIe-2	68	3r2	7	4
505F	Dunbarton silt loam, 18- to 30-percent slopes	28	VIIe-2	68	3r2	7	4
505F2	Dunbarton silt loam, 18- to 30-percent slopes, moderately eroded	28	VIIe-2	68	3r2	7	4
505F3	Dunbarton soils, 18- to 30-percent slopes, severely eroded	28	VIIe-2	68	3r2	7	4
505G	Dunbarton silt loam, 30- to 60-percent slopes	28	VIIe-2	68	3r3	7	4
505G2	Dunbarton silt loam, 30- to 60-percent slopes, moderately eroded	28	VIIe-2	68	3r3	7	4
505G3	Dunbarton soils, 30- to 60-percent slopes, severely eroded	28	VIIe-2	68	3r3	7	4
506C2	Hitt silt loam, 4- to 7-percent slopes, moderately eroded	34	IIe-1	61	3o1	1	1
506D2	Hitt silt loam, 7- to 12-percent slopes, moderately eroded	34	IIIe-1	63	3o1	1	3
506D3	Hitt soils, 7- to 12-percent slopes, severely eroded	34	IVe-1	65	3o1	1	3
506E2	Hitt silt loam, 12- to 18-percent slopes, moderately eroded	34	IVe-1	65	3r2	2	4
506F2	Hitt silt loam, 18- to 30-percent slopes, moderately eroded	34	VIe-1	67	3r2	3	4
511E3	Dunbarton soils, cherty variants, 12- to 18-percent slopes, severely eroded	28	VIIe-2	68	3r2	7	4
511F	Dunbarton silt loam, cherty variant, 18- to 30-percent slopes	28	VIIe-2	68	3r2	7	4
511F3	Dunbarton soils, cherty variants, 18- to 30-percent slopes, severely eroded	28	VIIe-2	68	3r2	7	4
511G2	Dunbarton silt loam, cherty variant, 30- to 60-percent slopes, moderately eroded	28	VIIe-2	68	3r3	7	4
546C2	Keltner silt loam, 4- to 7-percent slopes, moderately eroded	36	IIe-1	61	3o1	1	1
546D2	Keltner silt loam, 7- to 12-percent slopes, moderately eroded	36	IIIe-1	63	3o1	1	3
546E2	Keltner silt loam, 12- to 18-percent slopes, moderately eroded	36	IVe-1	65	3r2	2	4
546E3	Keltner soils, 12- to 18-percent slopes, severely eroded	36	VIe-1	67	3r2	2	4
546F2	Keltner silt loam, 18- to 30-percent slopes, moderately eroded	36	VIe-1	67	3r2	3	4

[a] The erosion symbol (2) for these mapping units is used mainly to indicate that these soils have thin surface horizons as the result of normal soil development; no statement of degree of erosion is implied.

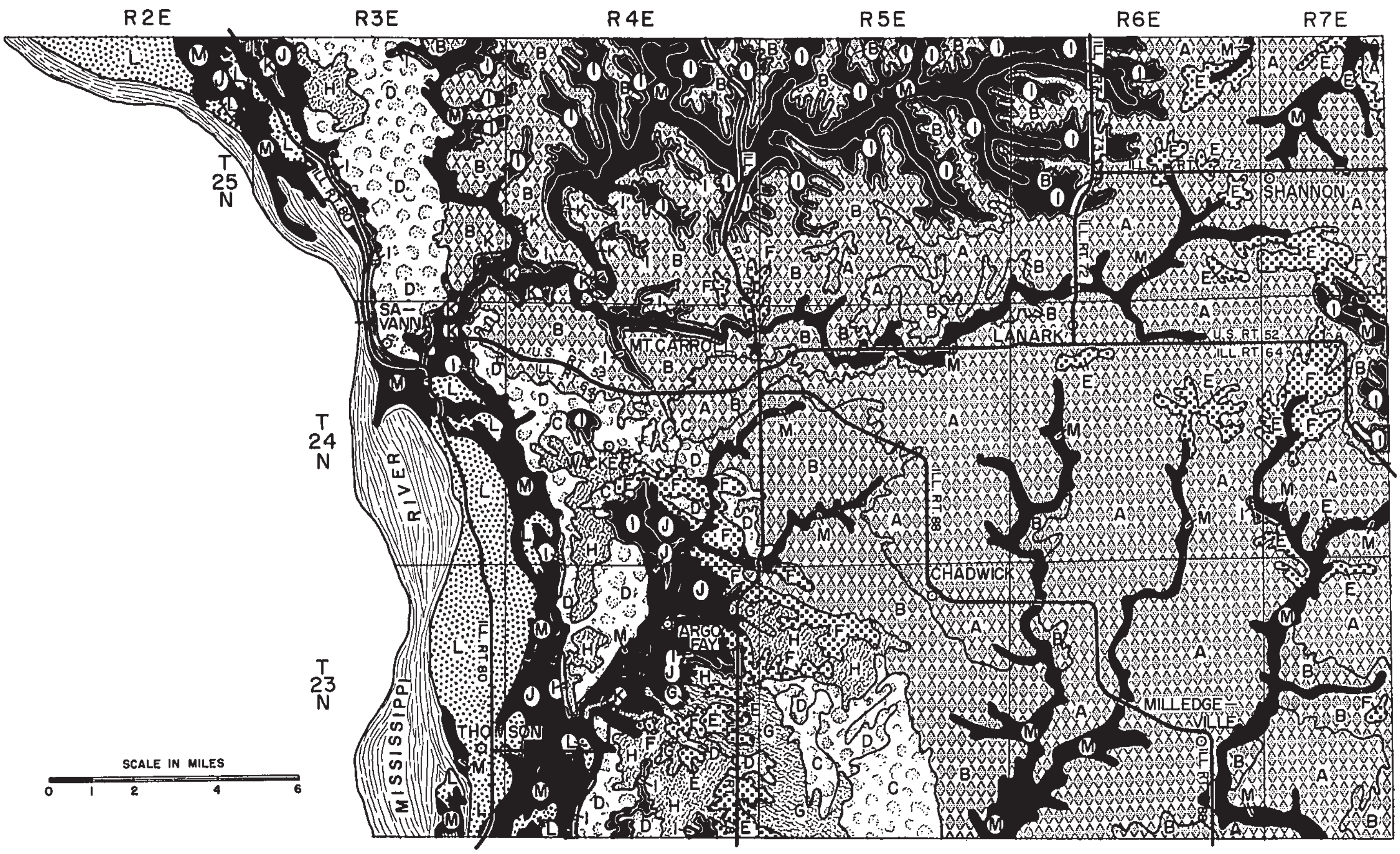
GUIDE TO MAPPING UNITS (cont.)

Map symbol	Mapping unit	Description Page	Capability unit Symbol	Capability unit Page	Woodland group	Wildlife group	Recreation group
562B	Port Byron silt loam, sandy substratum, 2- to 4-percent slopes	48	IIe-1	61	2o1	1	1
562C	Port Byron silt loam, sandy substratum, 4- to 7-percent slopes	48	IIe-1	61	2o1	1	1
562C2	Port Byron silt loam, sandy substratum, 4- to 7-percent slopes, moderately eroded	48	IIe-1	61	2o1	1	1
562D	Port Byron silt loam, sandy substratum, 7- to 12-percent slopes	48	IIIe-1	63	2o1	1	3
562D2	Port Byron silt loam, sandy substratum, 7- to 12-percent slopes, moderately eroded	48	IIIe-1	63	2o1	1	3
563B	Seaton silt loam, sandy substratum, 2- to 4-percent slopes	51	IIe-1	61	2o1	1	1
563C	Seaton silt loam, sandy substratum, 4- to 7-percent slopes	51	IIe-1	61	2o1	1	1
563C2	Seaton silt loam, sandy substratum, 4- to 7-percent slopes, moderately eroded	51	IIe-1	61	2o1	1	1
563D	Seaton silt loam, sandy substratum, 7- to 12-percent slopes	51	IIIe-1	63	2o1	1	3
563D2	Seaton silt loam, sandy substratum, 7- to 12-percent slopes, moderately eroded	51	IIIe-1	63	2o1	1	3
563D3	Seaton silt loam, sandy substratum, 7- to 12-percent slopes, severely eroded	51	IIIe-1	63	2o1	1	3
563E3	Seaton silt loam, sandy substratum, 12- to 18-percent slopes, severely eroded	51	IVe-1	65	2r2	2	4
564B	Waukegan silt loam, 2- to 4-percent slopes	56	IIe-3	62	3s2	7	1
564C	Waukegan silt loam, 4- to 7-percent slopes	56	IIIe-2	63	3s2	7	1
564C2	Waukegan silt loam, 4- to 7-percent slopes, moderately eroded	56	IIIe-2	63	3s2	7	1
564D2	Waukegan silt loam, 7- to 12-percent slopes, moderately eroded	56	IIIe-2	63	3s2	7	3
564E2	Waukegan silt loam, 12- to 18-percent slopes, moderately eroded	56	IVe-2	66	3s3	7	4
565B	Tell silt loam, 2- to 4-percent slopes	54	IIe-3	62	3s2	7	1
565C	Tell silt loam, 4- to 7-percent slopes	54	IIIe-2	63	3s2	7	1
565C2	Tell silt loam, 4- to 7-percent slopes, moderately eroded	54	IIIe-2	63	3s2	7	1
565D	Tell silt loam, 7- to 12-percent slopes	54	IIIe-2	63	3s2	7	3
565D2	Tell silt loam, 7- to 12-percent slopes, moderately eroded	54	IIIe-2	63	3s2	7	3
565D3	Tell silt loam, 7- to 12-percent slopes, severely eroded	54	IVe-2	66	3s2	7	3
565E2	Tell silt loam, 12- to 18-percent slopes, moderately eroded	54	IVe-2	66	3s3	7	4
565E3	Tell silt loam, 12- to 18-percent slopes, severely eroded	54	VIe-2	67	3s3	7	4
565F2	Tell silt loam, 18- to 30-percent slopes, moderately eroded	54	VIe-2	67	3s3	7	4
565F3	Tell silt loam, 18- to 30-percent slopes, severely eroded	54	VIIe-2	68	3s3	7	4
568A	Niota silty clay loam, clayey subsurface variant, 0- to 2-percent slopes	42	IIIw-1	64	3w2	6	7
568B	Niota silty clay loam, clayey subsurface variant, 2- to 4-percent slopes	42	IIIw-1	64	3w2	6	7
572C	Loran silt loam, 4- to 7-percent slopes	38	IIe-2	61	3o1	4	5
572D	Loran silt loam, 7- to 12-percent slopes	38	IIIe-3	64	3o1	4	5
572D2	Loran silt loam, 7- to 12-percent slopes, moderately eroded	38	IIIe-3	64	3o1	4	5
574B	Ogle silt loam, silt loam subsoil variant, 2- to 4-percent slopes	43	IIe-1	61	1o1	1	1
574C	Ogle silt loam, silt loam subsoil variant, 4- to 7-percent slopes	43	IIe-1	61	1o1	1	1
576A	Zwingle silt loam, 0- to 2-percent slopes	58	IIIw-1	64	3w2	6	7
576B	Zwingle silt loam, 2- to 4-percent slopes	58	IIIw-1	64	3w2	6	7
576C	Zwingle silt loam, 4- to 7-percent slopes	58	IIIe-3	64	3w2	6	7
577D	Terrace Escarpments, 7- to 12-percent slopes	55	VIIe-3	69	2r2	2	3
577E	Terrace Escarpments, 12- to 18-percent slopes	55	VIIe-3	69	2r2	2	4
577F	Terrace Escarpments, 18- to 30-percent slopes	55	VIIe-3	69	2r2	3	4
578	Dorchester silt loam, cobbly subsoil variant	25	I-2	60	1o4	5	6
660D2	Coatsburg silt loam, 7- to 12-percent slopes, moderately eroded	23	IVe-3	66	3r2	6	7
660D3	Coatsburg soils, 7- to 12-percent slopes, severely eroded	23	VIe-3	68	3r2	6	7
660E2	Coatsburg silt loam, 12- to 18-percent slopes, moderately eroded	23	VIe-3	68	3r2	6	7
660E3	Coatsburg soils, 12- to 18-percent slopes, severely eroded	23	VIIe-3	69	3r2	6	7
673B	Onarga fine sandy loam, reddish subsoil variant, 2- to 4-percent slopes	44	IIe-3	62	3s2	1	1
949C2	Eleroy and Derinda silt loams, 4- to 7-percent slopes, moderately eroded	24, 30	IIe-1	61	3o1	1	1
949D2	Eleroy and Derinda silt loams, 7- to 12-percent slopes, moderately eroded	24, 30	IIIe-1	63	3o1	1	3
949D3	Eleroy and Derinda soils, 7- to 12-percent slopes, severely eroded	24, 30	IVe-1	65	3o1	1	3
949E2	Eleroy and Derinda silt loams, 12- to 18-percent slopes, moderately eroded	24, 30	IVe-1	65	3r2	2	4
949E3	Eleroy and Derinda soils, 12- to 18-percent slopes, severely eroded	24, 30	VIe-1	67	3r2	2	4
949F2	Eleroy and Derinda silt loams, 18- to 30-percent slopes, moderately eroded	24, 30	VIe-1	67	3r2	3	4

GUIDE TO MAPPING UNITS (concluded)

Map symbol	Mapping unit	Description Page	Capability unit Symbol	Capability unit Page	Woodland group	Wildlife group	Recreation group
950C	Dubuque and Palsgrove silt loams, 4- to 7-percent slopes	27, 45	IIIe-1	63	3o1	7	3
950C2	Dubuque and Palsgrove silt loams, 4- to 7-percent slopes, moderately eroded	27, 45	IIIe-1	63	3o1	7	3
950D	Dubuque and Palsgrove silt loams, 7- to 12-percent slopes	27, 45	IVe-1	65	3o1	7	4
950D2	Dubuque and Palsgrove silt loams, 7- to 12-percent slopes, moderately eroded	27, 45	IVe-1	65	3o1	7	4
950D3	Dubuque and Palsgrove soils, 7- to 12-percent slopes, severely eroded	27, 45	VIe-1	67	3o1	7	4
950E	Dubuque and Palsgrove silt loams, 12- to 18-percent slopes	27, 45	VIe-1	67	3r2	7	4
950E2	Dubuque and Palsgrove silt loams, 12- to 18-percent slopes, moderately eroded	27, 45	VIe-1	67	3r2	7	4
950E3	Dubuque and Palsgrove soils, 12- to 18-percent slopes, severely eroded	27, 45	VIIe-1	68	3r2	7	4
950F	Dubuque and Palsgrove silt loams, 18- to 30-percent slopes	27, 45	VIIe-1	68	3r2	7	4
950F2	Dubuque and Palsgrove silt loams, 18- to 30-percent slopes, moderately eroded	27, 45	VIIe-1	68	3r2	7	4
950F3	Dubuque and Palsgrove soils, 18- to 30-percent slopes, severely eroded	27, 45	VIIe-1	68	3r2	7	4
950G	Dubuque and Palsgrove silt loams, 30- to 60-percent slopes	27, 45	VIIe-1	68	3r3	7	4
950G2	Dubuque and Palsgrove silt loams, 30- to 60-percent slopes, moderately eroded	27, 45	VIIe-1	68	3r3	7	4
951C or YC	Palsgrove and Woodbine silt loams, 4- to 7-percent slopes	45, 57	IIe-1	61	3o1	1	1
951C2 or YC2	Palsgrove and Woodbine silt loams, 4- to 7-percent slopes, moderately eroded	45, 57	IIe-1	61	3o1	1	1
951D or YD	Palsgrove and Woodbine silt loams, 7- to 12-percent slopes	45, 57	IIIe-1	63	3o1	1	3
951D2 or YD2	Palsgrove and Woodbine silt loams, 7- to 12-percent slopes, moderately eroded	45, 57	IIIe-1	63	3o1	1	3
951D3 or YD3	Palsgrove and Woodbine soils, 7- to 12-percent slopes, severely eroded	45, 57	IVe-1	65	3o1	1	3
951E or YE	Palsgrove and Woodbine silt loams, 12- to 18-percent slopes	45, 57	IVe-1	65	3r2	2	4
951E2 or YE2	Palsgrove and Woodbine silt loams, 12- to 18-percent slopes, moderately eroded	45, 57	IVe-1	65	3r2	2	4
951E3 or YE3	Palsgrove and Woodbine soils, 12- to 18-percent slopes, severely eroded	45, 57	VIe-1	67	3r2	2	4
951F or YF	Palsgrove and Woodbine silt loams, 18- to 30-percent slopes	45, 57	VIe-1	67	3r2	3	4
951F2 or YF2	Palsgrove and Woodbine silt loams, 18- to 30-percent slopes, moderately eroded	45, 57	VIe-1	67	3r2	3	4
951F3 or YF3	Palsgrove and Woodbine soils, 18- to 30-percent slopes, severely eroded	45, 57	VIe-1	67	3r2	3	4
951G2 or YG2	Palsgrove and Woodbine silt loams, 30- to 60-percent slopes, moderately eroded	45, 57	VIIe-1	68	3r3	3	4
951G3 or YG3	Palsgrove and Woodbine soils, 30- to 60-percent slopes severely eroded	45, 57	VIIe-1	68	3r3	3	4
952C or ZC	Tell-Lamont complex, 4- to 7-percent slopes	36, 54	IIIe-2	63	3s2	7	1
952C2 or ZC2	Tell-Lamont complex, 4- to 7-percent slopes, moderately eroded	36, 54	IIIe-2	63	3s2	7	1
952D2 or ZD2	Tell-Lamont complex, 7- to 12-percent slopes, moderately eroded	36, 54	IIIe-2	63	3s2	7	3
952D3 or ZD3	Tell-Lamont complex, 7- to 12-percent slopes, severely eroded	36, 54	IVe-2	66	3s2	7	3
952E2 or ZE2	Tell-Lamont complex, 12- to 18-percent slopes, moderately eroded	36, 54	IVe-2	66	3s3	7	4
952E3 or ZE3	Tell-Lamont complex, 12- to 18-percent slopes, severely eroded	36, 54	VIe-2	67	3s3	7	4
952F or ZF	Tell-Lamont complex, 18- to 30-percent slopes	36, 54	VIe-2	67	3s3	7	4
952F2 or ZF2	Tell-Lamont complex, 18- to 30-percent slopes, moderately eroded	36, 54	VIe-2	67	3s3	7	4
952F4 or ZF4	Tell-Lamont complex, 18- to 30-percent slopes, gullied	36, 54	VIIe-2	68	3s3	7	4
972D2 or XD2	Casco-Fox complex, 7- to 12-percent slopes, moderately eroded	22, 32	IVe-2	66	3s2	7	3
972E2 or XE2	Casco-Fox complex, 12- to 18-percent slopes, moderately eroded	22, 32	VIe-2	67	3s3	7	4
972E3 or XE3	Casco-Fox complex, 12- to 18-percent slopes, severely eroded	22, 32	VIIe-2	68	3s3	7	4

GENERAL SOIL MAP
CARROLL COUNTY, ILLINOIS



A — TAMA-MUSCATINE. Dark, poorly to well drained, moderate profile development in more than 5 feet of loess on uplands and terraces.

B — FAYETTE-ROZETTA. Light, moderately well to well drained, moderate profile development in more than 5 feet of loess mainly on uplands.

C — PORT BYRON-JOY. Dark, somewhat poorly to well drained, weak profile development in thick loess on uplands.

D — SEATON-TIMULA. Light, primarily well drained, weak profile development in thick loess on uplands.

E — OGLE-DURAND. Dark, primarily well drained, developed in thin loess and underlying glacial drift on uplands.

F — FLAGG-PECATONICA. Light, well drained, developed in thin loess and underlying glacial drift on uplands.

G — WAUKEGAN-DICKINSON. Dark, well to somewhat excessively drained, developed in sandy sediments or thin loess and sandy sediments on uplands.

H — TELL-LAMONT. Light, well to somewhat excessively drained, developed in sandy sediments or thin loess and sandy sediments on uplands.

I — PALSGROVE-DUBUQUE-DUNBARTON-SOGN. Light, primarily well drained, developed in combinations of loess, drift, and bedrock, mainly dolomite, on uplands with bedrock usually at less than 5 feet.

J — LITTLETON-WORTHEN. Dark, somewhat poorly to well drained, weak profile development in silty alluvium or colluvium on terraces or foot slopes.

K — NIOTA-ZWINGLE. Dark and light, somewhat poorly and poorly drained, developed mainly in silty clay or clay lacustrine deposits on terraces.

L — SPARTA-ADE. Mostly dark, somewhat excessively to excessively drained, developed in sands on terraces.

M — LAWSON-DORCHESTER-SAWMILL. Mostly dark, poorly to moderately well drained, weak profile development in recent alluvium on nearly level flood plains of major streams.

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* No longer available for distribution.
** Soil Report No. 72 for Livingston County replaces No. 25, No. 74 for Iroquois County replaces No. 22, No. 80 for Will County replaces No. 35, No. 81 for McHenry County replaces No. 21, No. 82 for Johnson County replaces No. 30, No. 83 for Wabash County replaces No. 61, No. 88 for Lake County replaces No. 9, No. 89 for Douglas County replaces No. 43, No. 90 for Edwards County replaces No. 46, No. 91 for La Salle County replaces No. 5, No. 92 for Logan County replaces No. 39, and No. 94 for Hardin County replaces No. 3.

Much new information about soils has been obtained since the printing of the older soil maps and reports in the above list, especially numbers 1 to 53, which were issued before 1933. For many areas this newer information is needed if the maps and other soil information in the reports are to be correctly interpreted. Help in making these interpretations can be obtained by writing to the Department of Agronomy, University of Illinois, Urbana 61801.

3M—11-75—31075

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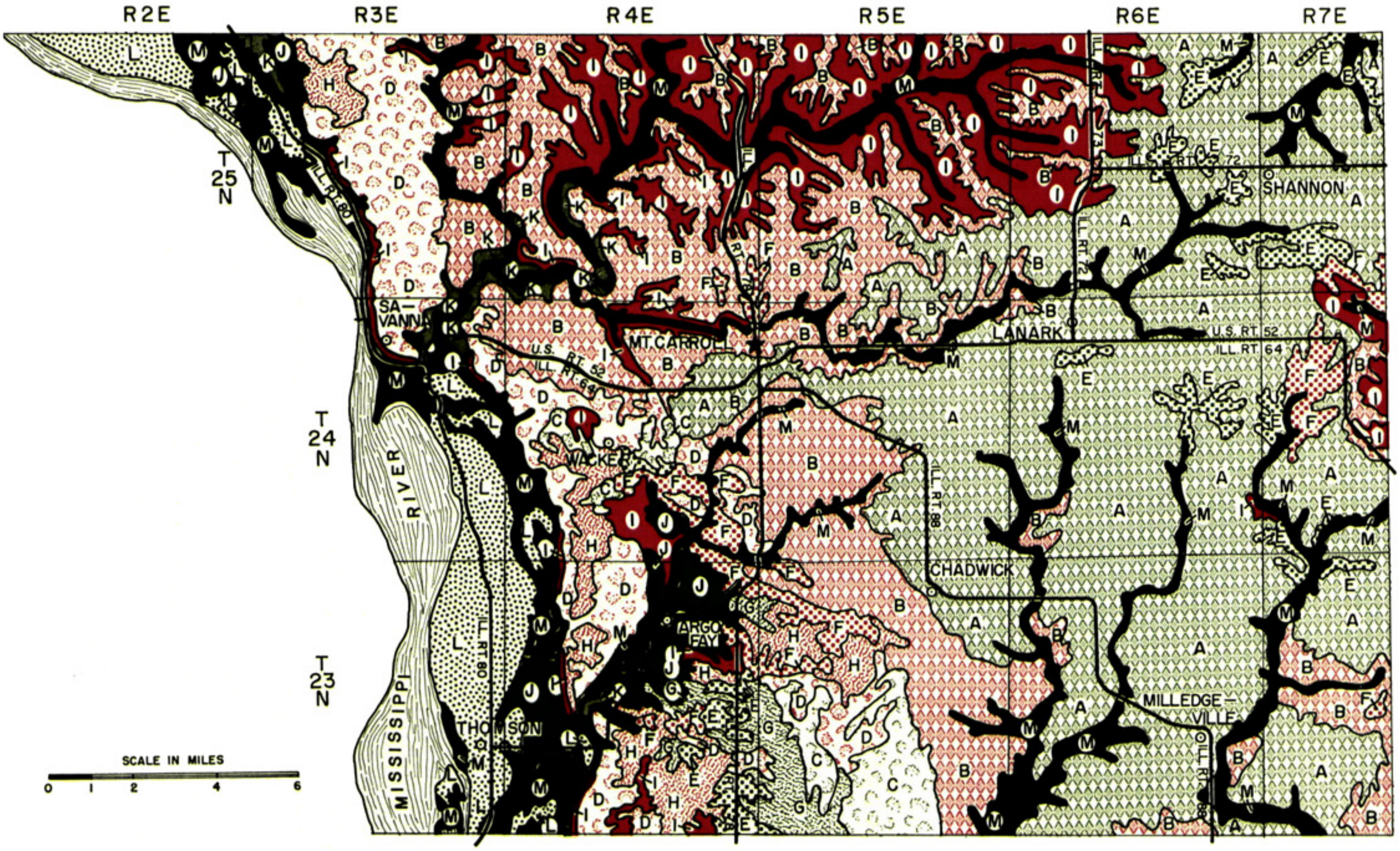
GENERAL SOIL MAP
CARROLL COUNTY, ILLINOIS



A — TAMA-MUSCATINE. Dark, poorly to well drained, moderate profile development in more than 5 feet of loess on uplands and terraces.

B — FAYETTE-ROZETTA. Light, moderately well to well drained, moderate profile development in more than 5 feet of loess mainly on uplands.

C — PORT BYRON-JOY. Dark, somewhat poorly to well drained, weak profile development in thick loess on uplands.

D — SEATON-TIMULA. Light, primarily well drained, weak profile development in thick loess on uplands.

E — OGLE-DURAND. Dark, primarily well drained, developed in thin loess and underlying glacial drift on uplands.

F — FLAGG-PECATONICA. Light, well drained, developed in thin loess and underlying glacial drift on uplands.

G — WAUKEGAN-DICKINSON. Dark, well to somewhat excessively drained, developed in sandy sediments or thin loess and sandy sediments on uplands.

H — TELL-LAMONT. Light, well to somewhat excessively drained, developed in sandy sediments or thin loess and sandy sediments on uplands.

I — PALSGROVE-DUBUQUE-DUNBARTON-SOGN. Light, primarily well drained, developed in combinations of loess, drift, and bedrock, mainly dolomite, on uplands with bedrock usually at less than 5 feet.

J — LITTLETON-WORTHEN. Dark, somewhat poorly to well drained, weak profile development in silty alluvium or colluvium on terraces or foot slopes.

K — NIOTA-ZWINGLE. Dark and light, somewhat poorly and poorly drained, developed mainly in silty clay or clay lacustrine deposits on terraces.

L — SPARTA-ADE. Mostly dark, somewhat excessively to excessively drained, developed in sands on terraces.

M — LAWSON-DORCHESTER-SAWMILL. Mostly dark, poorly to moderately well drained, weak profile development in recent alluvium on nearly level flood plains of major streams.

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

- Primary paved road
- U.S. marker
- Illinois marker
- Secondary paved road
- Graveled road
- Improved dirt road
- Secondary dirt and private road
- Railroad, single track
- Railroad, multiple track
- Railroad, abandoned
- House and buildings
- School, church, and cemetery
- Isolated business establishment
- Dam — OR
- Levee
- Made Land or Borrow Pit — M.L.
- Gravel Pit or Sand Pit — G.P.
- Pumping Station — P.S.
- Limestone Quarry — L.Q.

BOUNDARIES

- State
- County
- Township
- Section
- Town
- Park

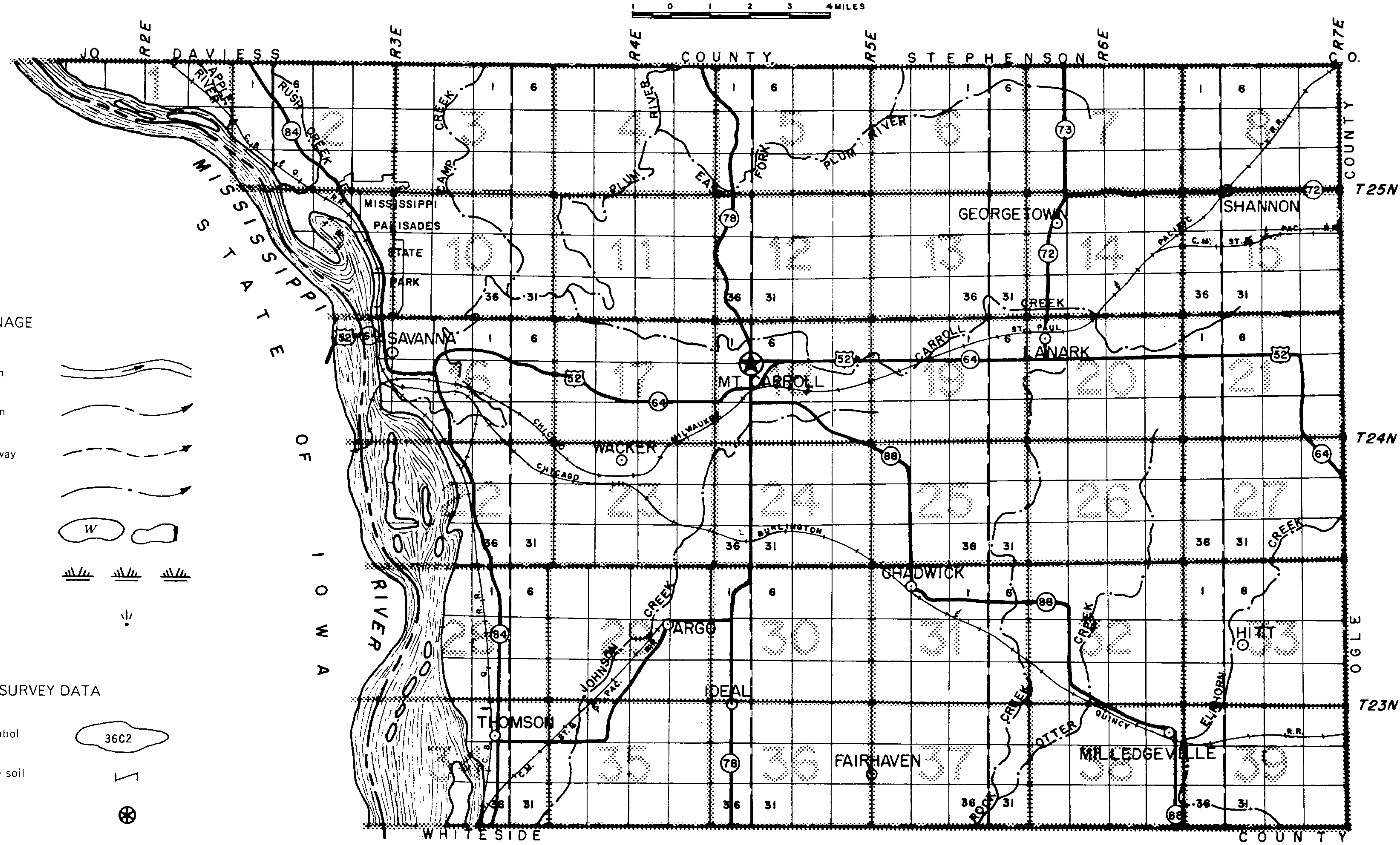
DRAINAGE

- Large perennial stream
- Small perennial stream
- Uncrossable drainageway
- Crossable drainageway
- Pond or lake — W
- Marsh
- Wet spot

SOIL SURVEY DATA

- Soil boundary and symbol — 36C2
- Connects area of same soil
- Sand blowout
- Sand spot
- Cherty surface
- Limestone outcrop
- Sandstone outcrop
- Shale outcrop
- Escarpment, not bedrock
- Escarpment, limestone
- Small, closed depression
- Sink hole

INDEX TO MAP SHEETS
CARROLL COUNTY, ILLINOIS

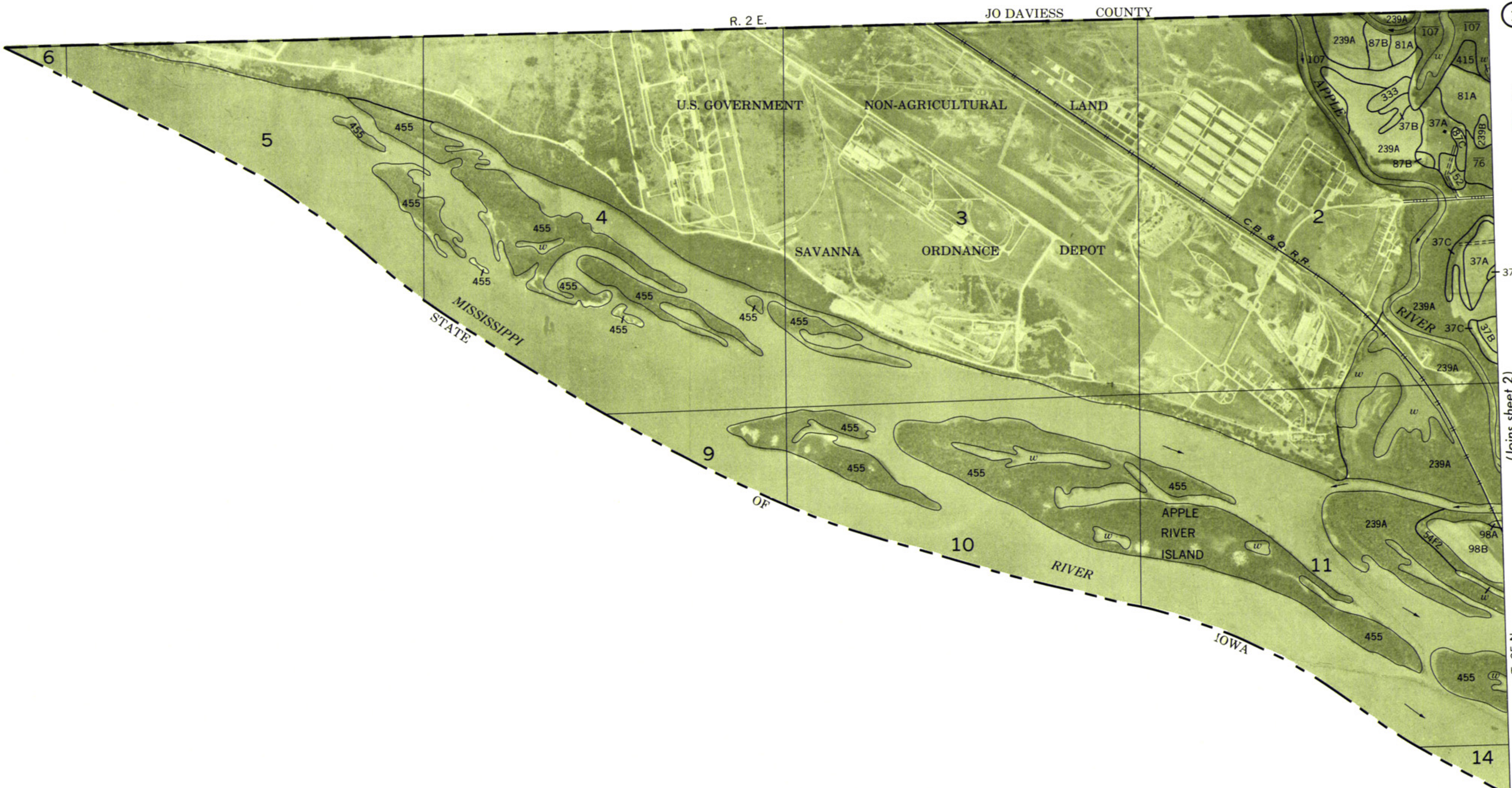


UNIVERSITY OF ILLINOIS
AGRICULTURAL EXPERIMENT STATION

CARROLL COUNTY, ILLINOIS
SOIL LEGEND

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Symbol	Name
19E3	Sylvan soils, 12-18 % slopes, severely eroded
19F2	Sylvan silt loam, 18-30 % slopes, moderately eroded
19F3	Sylvan soils, 18-30 % slopes, severely eroded
19G2	Sylvan silt loam, 30-60 % slopes, moderately eroded
19G3	Sylvan soils, 30-60 % slopes, severely eroded
21B	Pecatonica silt loam, 2-4 % slopes
21C	Pecatonica silt loam, 4-7 % slopes
21C2	Pecatonica silt loam, 4-7 % slopes, moderately eroded
21C3	Pecatonica soils, 4-7 % slopes, severely eroded
21D	Pecatonica silt loam, 7-12 % slopes
21D2	Pecatonica silt loam, 7-12 % slopes, moderately eroded
21D3	Pecatonica soils, 7-12 % slopes, severely eroded
21E	Pecatonica silt loam, 12-18 % slopes
21E2	Pecatonica silt loam, 12-18 % slopes moderately eroded
21E3	Pecatonica soils, 12-18 % slopes, severely eroded
21F	Pecatonica silt loam, 18-30 % slopes
21F2	Pecatonica silt loam, 18-30 % slopes, moderately eroded
21F3	Pecatonica soils, 18-30 % slopes, severely eroded
30D2	Hamburg silt loam, 7-12 % slopes
30F2	Hamburg silt loam, 18-30 % slopes
30G2	Hamburg silt loam, 30-60 % slopes
36A	Tama silt loam, 0-2 % slopes
36B	Tama silt loam, 2-4 % slopes
36B2	Tama silt loam, 2-4 % slopes, moderately eroded
36C	Tama silt loam, 4-7 % slopes
36C2	Tama silt loam, 4-7 % slopes, moderately eroded
36C3	Tama silt loam, 4-7 % slopes, severely eroded
36D	Tama silt loam, 7-12 % slopes
36D2	Tama silt loam, 7-12 % slopes, moderately eroded
36D3	Tama silt loam, 7-12 % slopes, severely eroded
36E2	Tama silt loam, 12-18 % slopes, moderately eroded
36E3	Tama silt loam, 12-18 % slopes, severely eroded
37A	Worthen silt loam, 0-2 % slopes
37B	Worthen silt loam, 2-4 % slopes
37C	Worthen silt loam, 4-7 % slopes
37D2	Worthen silt loam, 7-12 % slopes, moderately eroded
41A	Muscatine silt loam, 0-2 % slopes
41B	Muscatine silt loam, 2-4 % slopes
53B	Bloomfield fine sand, 2-4 % slopes
53D	Bloomfield fine sand, 7-12 % slopes
53F	Bloomfield fine sand, 18-30 % slopes
54B	Plainfield sand, 2-4 % slopes
54C3	Plainfield sand, 4-7 % slopes, severely wind eroded
54F2	Plainfield sand, 18-30 % slopes
61A	Atterberry silt loam, 0-2 % slopes
61B	Atterberry silt loam, 2-4 % slopes
63	Blown-Out Land
68	Sable silty clay loam
68+	Sable silt loam, overwash
75B	Drury silt loam, 2-4 % slopes
75C	Drury silt loam, 4-7 % slopes
75C2	Drury silt loam, 4-7 % slopes, moderately eroded
75D2	Drury silt loam, 7-12 % slopes, moderately eroded
75E2	Drury silt loam, 12-18 % slopes, moderately eroded
75F2	Drury silt loam, 18-30 % slopes, moderately eroded
76	Otter silt loam
$\overline{76}$	Otter silt loam, wet
77	Huntsville silt loam
81A	Littleton silt loam, 0-2 % slopes
81B	Littleton silt loam, 2-4 % slopes
81C	Littleton silt loam, 4-7 % slopes
82	Millington silt loam
$\overline{82}$	Millington silt loam, wet
87A	Dickinson sandy loam, 0-2 % slopes
87B	Dickinson sandy loam, 2-4 % slopes
87C	Dickinson sandy loam, 4-7 % slopes
87C2	Dickinson sandy loam, 4-7 % slopes, moderately eroded
87E2	Dickinson sandy loam, 12-18 % slopes, moderately eroded
88A	Sparta loamy sand, 0-2 % slopes
88B	Sparta loamy sand, 2-4 % slopes
88C	Sparta loamy sand, 4-7 % slopes
88C2	Sparta loamy sand, 4-7 % slopes, moderately eroded
88D	Sparta loamy sand, 7-12 % slopes
88E	Sparta loamy sand, 12-18 % slopes
93E2	Rodman gravelly loam, 12-18 % slopes, moderately eroded
98A	Ade loamy fine sand, 0-2 % slopes
98B	Ade loamy fine sand, 2-4 % slopes
98C	Ade loamy fine sand, 4-7 % slopes
98D	Ade loamy fine sand, 7-12 % slopes
100	Palms muck
$\overline{100}$	Palms muck, wet
107	Sawmill silty clay loam
$\overline{107}$	Sawmill silty clay loam, wet
107+	Sawmill silt loam, overwash
125	Selma loam
134A	Camden silt loam, 0-2 % slopes
134B	Camden silt loam, 2-4 % slopes
134C	Camden silt loam, 4-7 % slopes
134C2	Camden silt loam, 4-7 % slopes, moderately eroded
134D2	Camden silt loam, 7-12 % slopes, moderately eroded
134E2	Camden silt loam, 12-18 % slopes, moderately eroded
152	Drummer silty clay loam
172	Hoopeston sandy loam
175B	Lamont fine sandy loam, 2-4 % slopes
175C	Lamont fine sandy loam, 4-7 % slopes
175C2	Lamont fine sandy loam, 4-7 % slopes, moderately eroded
175D	Lamont fine sandy loam, 7-12 % slopes
175D2	Lamont fine sandy loam, 7-12 % slopes, moderately eroded
175D3	Lamont fine sandy loam, 7-12 % slopes, severely eroded
175E2	Lamont fine sandy loam, 12-18 % slopes, moderately eroded
175E3	Lamont fine sandy loam, 12-18 % slopes, severely eroded
175F2	Lamont fine sandy loam, 18-30 % slopes, moderately eroded
175F3	Lamont fine sandy loam, 18-30 % slopes, severely eroded
201	Gilford fine sandy loam
210	Lena muck
$\overline{210}$	Lena muck, wet
224C2	Strawn silt loam, 4-7 % slopes, moderately eroded
224D2	Strawn silt loam, 7-12 % slopes, moderately eroded
224E2	Strawn silt loam, 12-18 % slopes, moderately eroded
224E3	Strawn soils, 12-18 % slopes, severely eroded
224F2	Strawn silt loam, 18-30 % slopes, moderately eroded
224F3	Strawn soils, 18-30 % slopes, severely eroded
227B	Argyle silt loam, 2-4 % slopes
227C	Argyle silt loam, 4-7 % slopes
227C2	Argyle silt loam, 4-7 % slopes, moderately eroded
227D2	Argyle silt loam, 7-12 % slopes, moderately eroded
227E2	Argyle silt loam, 12-18 % slopes, moderately eroded
237	Hoopeston loam
237+	Hoopeston silt loam, overwash
$\overline{237}$	Hoopeston loam, wet
239A	Dorchester silt loam, 0-2 % slopes
$\overline{239A}$	Dorchester silt loam, 0-2 % slopes, wet
239B	Dorchester silt loam, 2-4 % slopes
261	Niota silt loam
268B	Mt. Carroll silt loam, 2-4 % slopes
268C	Mt. Carroll silt loam, 4-7 % slopes
268C2	Mt. Carroll silt loam, 4-7 % slopes, moderately eroded
268D2	Mt. Carroll silt loam, 7-12 % slopes, moderately eroded
271E2	Timula silt loam, 12-18 % slopes, moderately eroded
271F2	Timula silt loam, 18-30 % slopes, moderately eroded
271G2	Timula silt loam, 30-60 % slopes, moderately eroded
272	Edgington silt loam
272+	Edgington silt loam, overwash
274B	Seaton silt loam, 2-4 % slopes
274C	Seaton silt loam, 4-7 % slopes
274D	Seaton silt loam, 7-12 % slopes
274D2	Seaton silt loam, 7-12 % slopes, moderately eroded
274D3	Seaton silt loam, 7-12 % slopes, severely eroded
274E	Seaton silt loam, 12-18 % slopes
274E2	Seaton silt loam, 12-18 % slopes, moderately eroded
274E3	Seaton silt loam, 12-18 % slopes, severely eroded
274F	Seaton silt loam, 18-30 % slopes
274F2	Seaton silt loam, 18-30 % slopes, moderately eroded
274F3	Seaton silt loam, 18-30 % slopes, severely eroded
274G2	Seaton silt loam, 30-60 % slopes, moderately eroded
275A	Joy silt loam, 0-2 % slopes
275B	Joy silt loam, 2-4 % slopes
277A	Port Byron silt loam, 0-2 % slopes
277B	Port Byron silt loam, 2-4 % slopes
277C	Port Byron silt loam, 4-7 % slopes
277C2	Port Byron silt loam, 4-7 % slopes, moderately eroded
277D	Port Byron silt loam, 7-12 % slopes
277D2	Port Byron silt loam, 7-12 % slopes, moderately eroded
277D3	Port Byron silt loam, 7-12 % slopes, severely eroded
279A	Rozetta silt loam, 0-2 % slopes
279B	Rozetta silt loam, 2-4 % slopes
279C	Rozetta silt loam, 4-7 % slopes
280B	Fayette silt loam, 2-4 % slopes
280B2	Fayette silt loam, 2-4 % slopes, moderately eroded
280C	Fayette silt loam, 4-7 % slopes
280C2	Fayette silt loam, 4-7 % slopes, moderately eroded
280D	Fayette silt loam, 7-12 % slopes
280D2	Fayette silt loam, 7-12 % slopes, moderately eroded
280D3	Fayette soils, 7-12 % slopes, severely eroded
280E	Fayette silt loam, 12-18 % slopes
280E2	Fayette silt loam, 12-18 % slopes, moderately eroded
280E3	Fayette soils, 12-18 % slopes, severely eroded
280F	Fayette silt loam, 18-30 % slopes
280F2	Fayette silt loam, 18-30 % slopes, moderately eroded
280F3	Fayette soils, 18-30 % slopes, severely eroded
280G	Fayette silt loam, 30-60 % slopes
280G2	Fayette silt loam, 30-60 % slopes, moderately eroded
282E3	Chute fine sand, 12-18 % slopes, severely eroded
282F3	Chute fine sand, 18-30 % slopes, severely eroded
333	Wakeland silt loam
386A	Downs silt loam, 0-2 % slopes
386B	Downs silt loam, 2-4 % slopes
386C	Downs silt loam, 4-7 % slopes
386C2	Downs silt loam, 4-7 % slopes, moderately eroded
386D	Downs silt loam, 7-12 % slopes
386D2	Downs silt loam, 7-12 % slopes, moderately eroded
386E	Downs silt loam, 12-18 % slopes
386E2	Downs silt loam, 12-18 % slopes, moderately eroded
411B	Ashdale silt loam, 2-4 % slopes
411C2	Ashdale silt loam, 4-7 % slopes, moderately eroded
411D2	Ashdale silt loam, 7-12 % slopes, moderately eroded
411E3	Ashdale silt loam, 12-18 % slopes, severely eroded
412C	Ogle silt loam, 4-7 % slopes
412C2	Ogle silt loam, 4-7 % slopes, moderately eroded
412D2	Ogle silt loam, 7-12 % slopes, moderately eroded
412D3	Ogle soils, 7-12 % slopes, severely eroded
412E2	Ogle silt loam, 12-18 % slopes, moderately eroded
413D2	Gale silt loam, 7-12 % slopes, moderately eroded
413F2	Gale silt loam, 18-30 % slopes, moderately eroded
414B	Myrtle silt loam, 2-4 % slopes
414C	Myrtle silt loam, 4-7 % slopes
414C2	Myrtle silt loam, 4-7 % slopes, moderately eroded
414D2	Myrtle silt loam, 7-12 % slopes, moderately eroded
415	Orion silt loam
416C	Durand silt loam, 4-7 % slopes
416C2	Durand silt loam, 4-7 % slopes, moderately eroded
416D2	Durand silt loam, 7-12 % slopes, moderately eroded
416D3	Durand soils, 7-12 % slopes, severely eroded
416E2	Durand silt loam, 12-18 % slopes, moderately eroded
416E3	Durand soils, 12-18 % slopes, severely eroded
419B	Flagg silt loam, 2-4 % slopes
419C	Flagg silt loam, 4-7 % slopes
419C2	Flagg silt loam, 4-7 % slopes, moderately eroded
419D	Flagg silt loam, 7-12 % slopes
419D2	Flagg silt loam, 7-12 % slopes, moderately eroded
419D3	Flagg soils, 7-12 % slopes, severely eroded
419E2	Flagg silt loam, 12-18 % slopes, moderately eroded
419E3	Flagg soils, 12-18 % slopes, severely eroded
451	Lawson silt loam
$\overline{451}$	Lawson silt loam, wet
455	Mixed Alluvial Land
504E2	Sogn silt loam, 12-30 % slopes
504G2	Sogn silt loam, 30-60 % slopes
505D2	Dunbarton silt loam, 7-12 % slopes, moderately eroded
505D3	Dunbarton soils, 7-12 % slopes, severely eroded
505E	Dunbarton silt loam, 12-18 % slopes
505E2	Dunbarton silt loam, 12-18 % slopes, moderately eroded
505E3	Dunbarton soils, 12-18 % slopes, severely eroded
505F	Dunbarton silt loam, 18-30 % slopes
505F2	Dunbarton silt loam, 18-30 % slopes, moderately eroded
505F3	Dunbarton soils, 18-30 % slopes, severely eroded
505G	Dunbarton silt loam, 30-60 % slopes
505G2	Dunbarton silt loam, 30-60 % slopes, moderately eroded
505G3	Dunbarton soils, 30-60 % slopes, severely eroded
506C2	Hitt silt loam, 4-7 % slopes, moderately eroded
506D2	Hitt silt loam, 7-12 % slopes, moderately eroded
506D3	Hitt soils, 7-12 % slopes, severely eroded
506E2	Hitt silt loam, 12-18 % slopes, moderately eroded
506F2	Hitt silt loam, 18-30 % slopes, moderately eroded
511E3	Dunbarton soils, cherty variants, 12-18 % slopes, severely eroded
511F	Dunbarton silt loam, cherty variant, 18-30 % slopes
511F3	Dunbarton soils, cherty variants, 18-30 % slopes, severely eroded
511G2	Dunbarton silt loam, cherty variant, 30-60 % slopes, moderately eroded
546C2	Keltner silt loam, 4-7 % slopes, moderately eroded
546D2	Keltner silt loam, 7-12 % slopes, moderately eroded
546E2	Keltner silt loam, 12-18 % slopes, moderately eroded
546E3	Keltner soils, 12-18 % slopes, severely eroded
546F2	Keltner silt loam, 18-30 % slopes, moderately eroded
562B	Port Byron silt loam, sandy substratum, 2-4 % slopes
562C	Port Byron silt loam, sandy substratum, 4-7 % slopes
562C2	Port Byron silt loam, sandy substratum, 4-7 % slopes, moderately eroded
562D	Port Byron silt loam, sandy substratum, 7-12 % slopes
562D2	Port Byron silt loam, sandy substratum, 7-12 % slopes, moderately eroded
563B	Seaton silt loam, sandy substratum, 2-4 % slopes
563C	Seaton silt loam, sandy substratum, 4-7 % slopes
563C2	Seaton silt loam, sandy substratum, 4-7 % slopes, moderately eroded
563D	Seaton silt loam, sandy substratum, 7-12 % slopes
563D2	Seaton silt loam, sandy substratum, 7-12 % slopes, moderately eroded
563D3	Seaton silt loam, sandy substratum, 7-12 % slopes, severely eroded
563E3	Seaton silt loam, sandy substratum, 12-18 % slopes, severely eroded
564B	Waukegan silt loam, 2-4 % slopes
564C	Waukegan silt loam, 4-7 % slopes
564C2	Waukegan silt loam, 4-7 % slopes, moderately eroded
564D2	Waukegan silt loam, 7-12 % slopes, moderately eroded
564E2	Waukegan silt loam, 12-18 % slopes, moderately eroded
565B	Tell silt loam, 2-4 % slopes
565C	Tell silt loam, 4-7 % slopes
565C2	Tell silt loam, 4-7 % slopes, moderately eroded
565D	Tell silt loam, 7-12 % slopes
565D2	Tell silt loam, 7-12 % slopes, moderately eroded
565D3	Tell silt loam, 7-12 % slopes, severely eroded
565E2	Tell silt loam, 12-18 % slopes, moderately eroded
565E3	Tell silt loam, 12-18 % slopes, severely eroded
565F2	Tell silt loam, 18-30 % slopes, moderately eroded
565F3	Tell silt loam, 18-30 % slopes, severely eroded
568A	Niota silty clay loam, clayey subsurface variant, 0-2 % slopes
568B	Niota silty clay loam, clayey subsurface variant, 2-4 % slopes
572C	Loran silt loam, 4-7 % slopes
572D	Loran silt loam, 7-12 % slopes
572D2	Loran silt loam, 7-12 % slopes, moderately eroded
574B	Ogle silt loam, silt loam subsoil variant, 2-4 % slopes
574C	Ogle silt loam, silt loam subsoil variant, 4-7 % slopes
576A	Zwingle silt loam, 0-2 % slopes
576B	Zwingle silt loam, 2-4 % slopes
576C	Zwingle silt loam, 4-7 % slopes
577D	Terrace Escarpments, 7-12 % slopes
577E	Terrace Escarpments, 12-18 % slopes
577F	Terrace Escarpments, 18-30 % slopes
578	Dorchester silt loam, cobbly subsoil variant
660D2	Coatsburg silt loam, 7-12 % slopes, moderately eroded
660D3	Coatsburg soils, 7-12 % slopes, severely eroded
660E2	Coatsburg silt loam, 12-18 % slopes, moderately eroded
660E3	Coatsburg soils, 12-18 % slopes, severely eroded
673B	Onarga fine sandy loam, reddish subsoil variant, 2-4 % slopes
949C2	Eleroy and Derinda silt loams, 4-7 % slopes, moderately eroded
949D2	Eleroy and Derinda silt loams, 7-12 % slopes, moderately eroded
949D3	Eleroy and Derinda soils, 7-12 % slopes, severely eroded
949E2	Eleroy and Derinda silt loams, 12-18 % slopes, moderately eroded
949E3	Eleroy and Derinda soils, 12-18 % slopes, severely eroded
949F2	Eleroy and Derinda silt loams, 18-30 % slopes, moderately eroded
950C	Dubuque and Palsgrove silt loams, 4-7 % slopes
950C2	Dubuque and Palsgrove silt loams, 4-7 % slopes, moderately eroded
950D	Dubuque and Palsgrove silt loams, 7-12 % slopes
950D2	Dubuque and Palsgrove silt loams, 7-12 % slopes, moderately eroded
950D3	Dubuque and Palsgrove soils, 7-12 % slopes, severely eroded
950E	Dubuque and Palsgrove silt loams, 12-18 % slopes
950E2	Dubuque and Palsgrove silt loams, 12-18 % slopes, moderately eroded
950E3	Dubuque and Palsgrove soils, 12-18 % slopes, severely eroded
950F	Dubuque and Palsgrove silt loams, 18-30 % slopes
950F2	Dubuque and Palsgrove silt loams, 18-30 % slopes, moderately eroded
950F3	Dubuque and Palsgrove soils, 18-30 % slopes, severely eroded
950G	Dubuque and Palsgrove silt loams, 30-60 % slopes
950G2	Dubuque and Palsgrove silt loams, 30-60 % slopes, moderately eroded
951C or YC	Palsgrove and Woodbine silt loams, 4-7 % slopes
951C2 or YC2	Palsgrove and Woodbine silt loams, 4-7 % slopes, moderately eroded
951D or YD	Palsgrove and Woodbine silt loams, 7-12 % slopes
951D2 or YD2	Palsgrove and Woodbine silt loams, 7-12 % slopes, moderately eroded
951D3 or YD3	Palsgrove and Woodbine soils, 7-12 % slopes, severely eroded
951E or YE	Palsgrove and Woodbine silt loams, 12-18 % slopes
951E2 or YE2	Palsgrove and Woodbine silt loams, 12-18 % slopes, moderately eroded
951E3 or YE3	Palsgrove and Woodbine soils, 12-18 % slopes, severely eroded
951F or YF	Palsgrove and Woodbine silt loams, 18-30 % slopes
951F2 or YF2	Palsgrove and Woodbine silt loams, 18-30 % slopes, moderately eroded
951F3 or YF3	Palsgrove and Woodbine soils, 18-30 % slopes, severely eroded
951G2 or YG2	Palsgrove and Woodbine silt loams, 30-60 % slopes, moderately eroded
951G3 or YG3	Palsgrove and Woodbine soils, 30-60 % slopes, severely eroded
952C or ZC	Tell-Lamont complex, 4-7 % slopes
952C2 or ZC2	Tell-Lamont complex, 4-7 % slopes, moderately eroded
952D2 or ZD2	Tell-Lamont complex, 7-12 % slopes, moderately eroded
952D3 or ZD3	Tell-Lamont complex, 7-12 % slopes, severely eroded
952E2 or ZE2	Tell-Lamont complex, 12-18 % slopes, moderately eroded
952E3 or ZE3	Tell-Lamont complex, 12-18 % slopes, severely eroded
952F or ZF	Tell-Lamont complex, 18-30 % slopes
952F2 or ZF2	Tell-Lamont complex, 18-30 % slopes, moderately eroded
952F4 or ZF4	Tell-Lamont complex, 18-30 % slopes, gullied
972D2 or XD2	Casco-Fox complex, 7-12 % slopes, moderately eroded
972E2 or XE2	Casco-Fox complex, 12-18 % slopes, moderately eroded
972E3 or XE3	Casco-Fox complex, 12-18 % slopes, severely eroded



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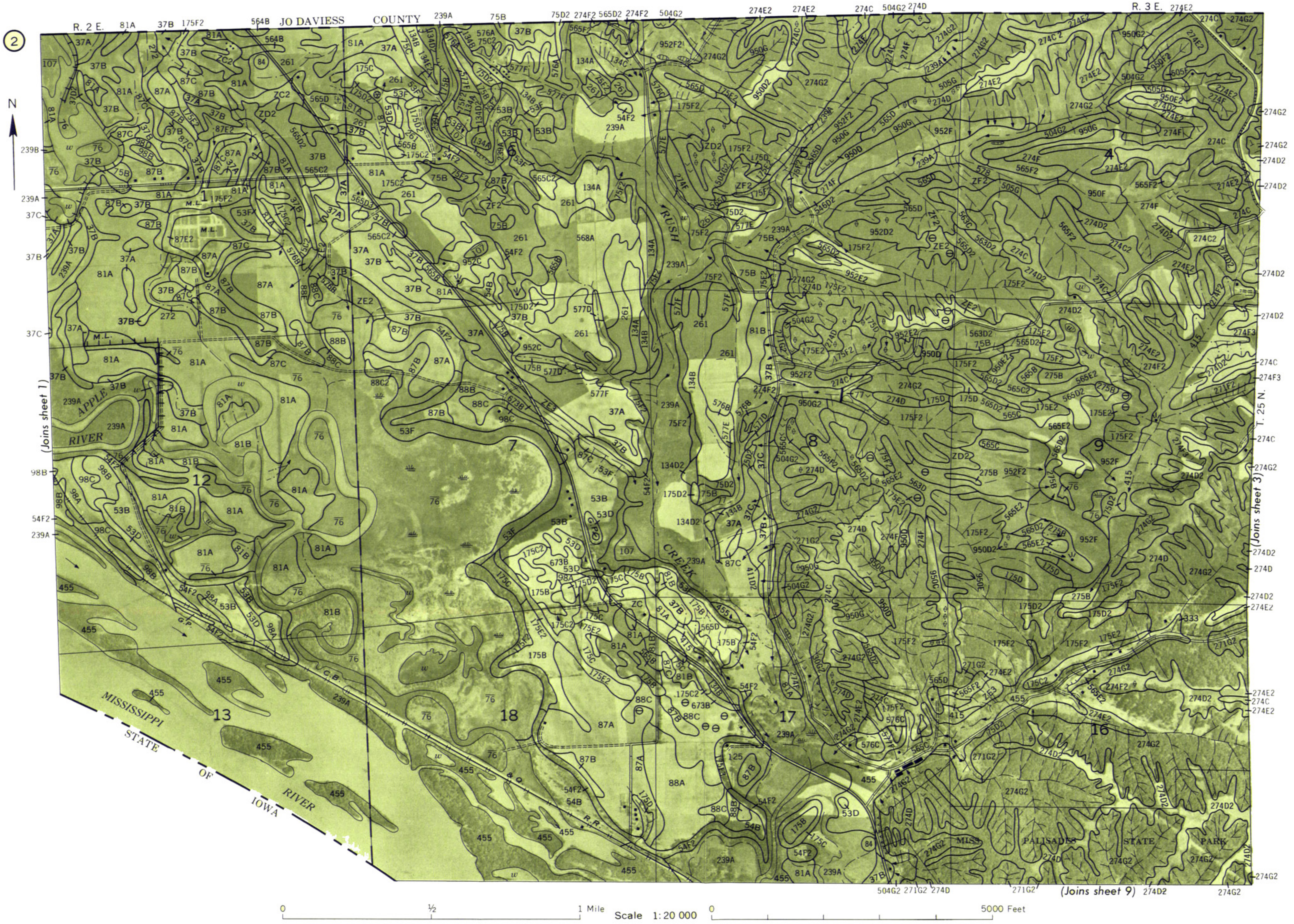
2
R. 2 E.
R. 3 E.
JO DAVIESS COUNTY
N
APPLE RIVER
RUSH CREEK
MISSISSIPPI RIVER
STATE OF IOWA
MISS. PALISADES STATE PARK
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(Joins sheet 3)
(Joins sheet 9)
T. 25 N.
M.L.
C.B. & Q. R.R.
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1 Mile
Scale 1:20 000
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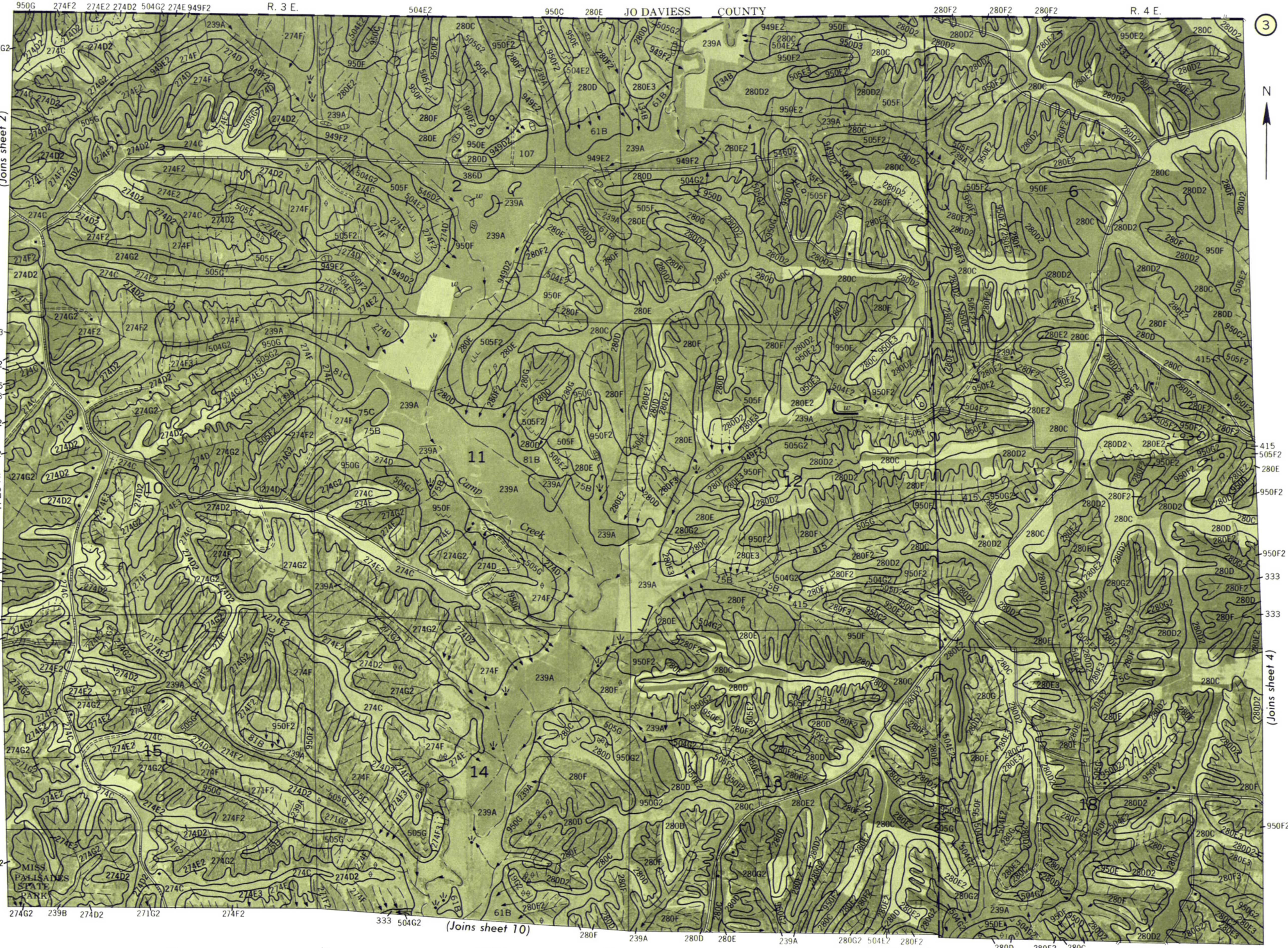
5000 Feet



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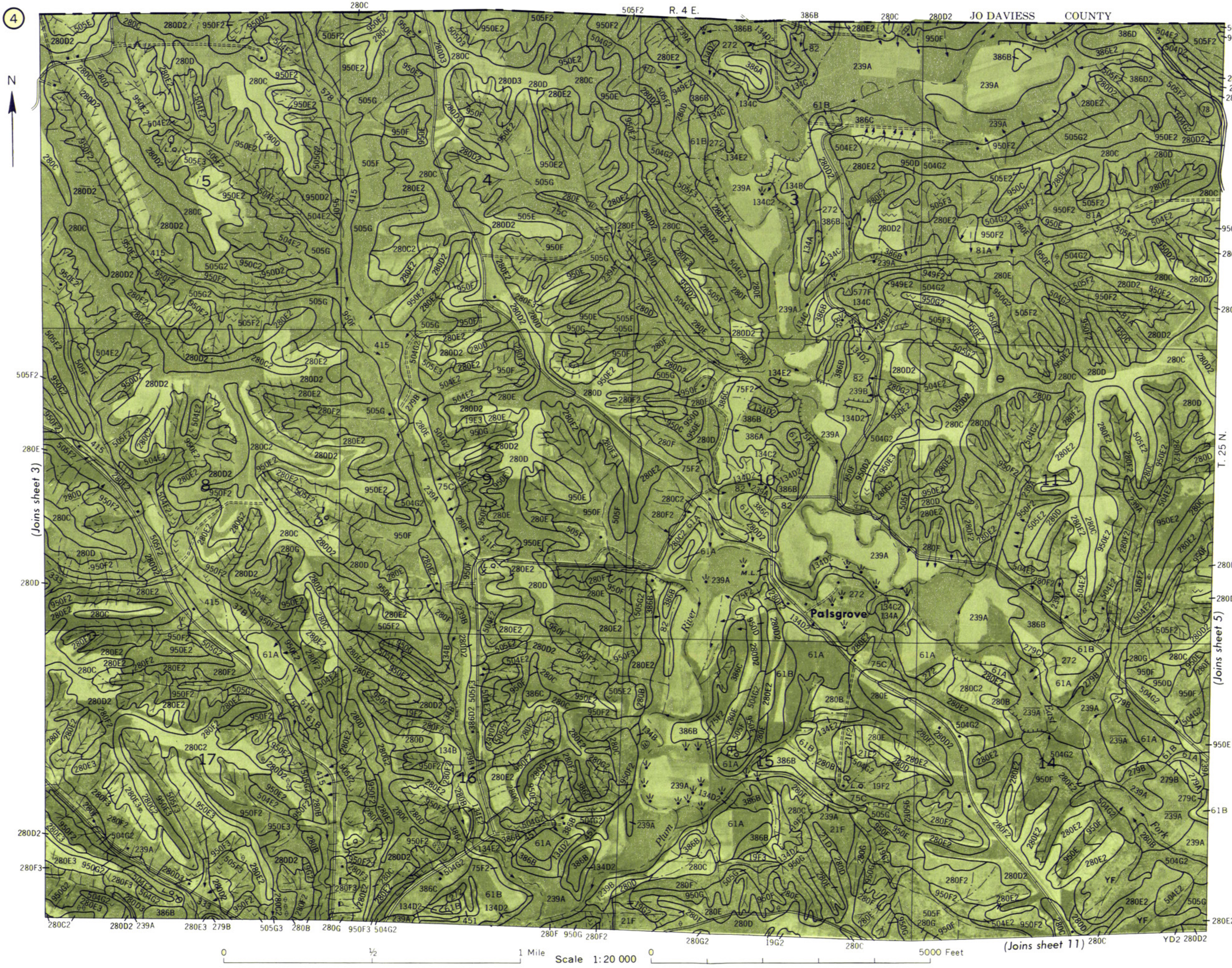
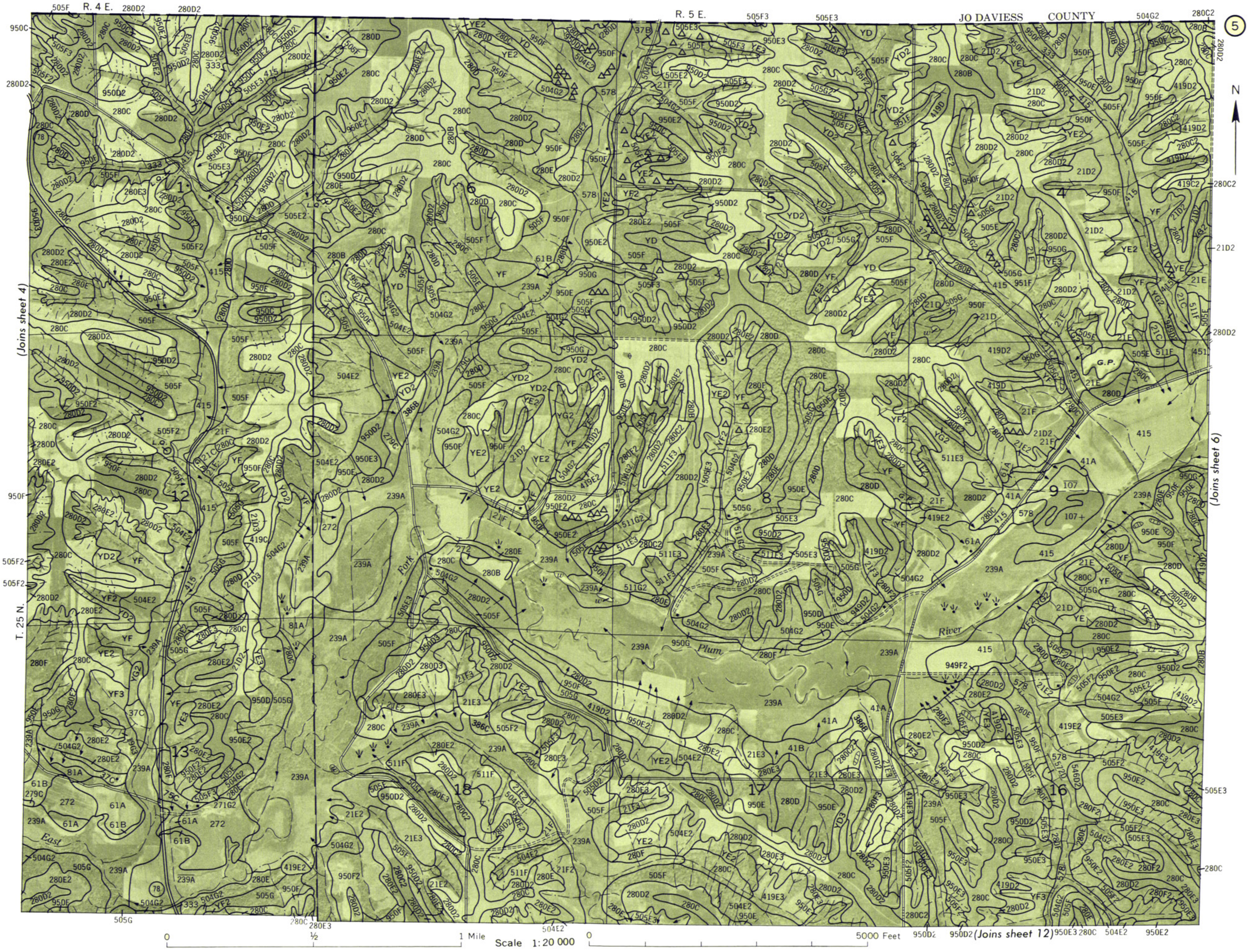
Scale 1:20 000
0 5000 Feet

CARROLL COUNTY, ILLINOIS — SHEET NUMBER 4

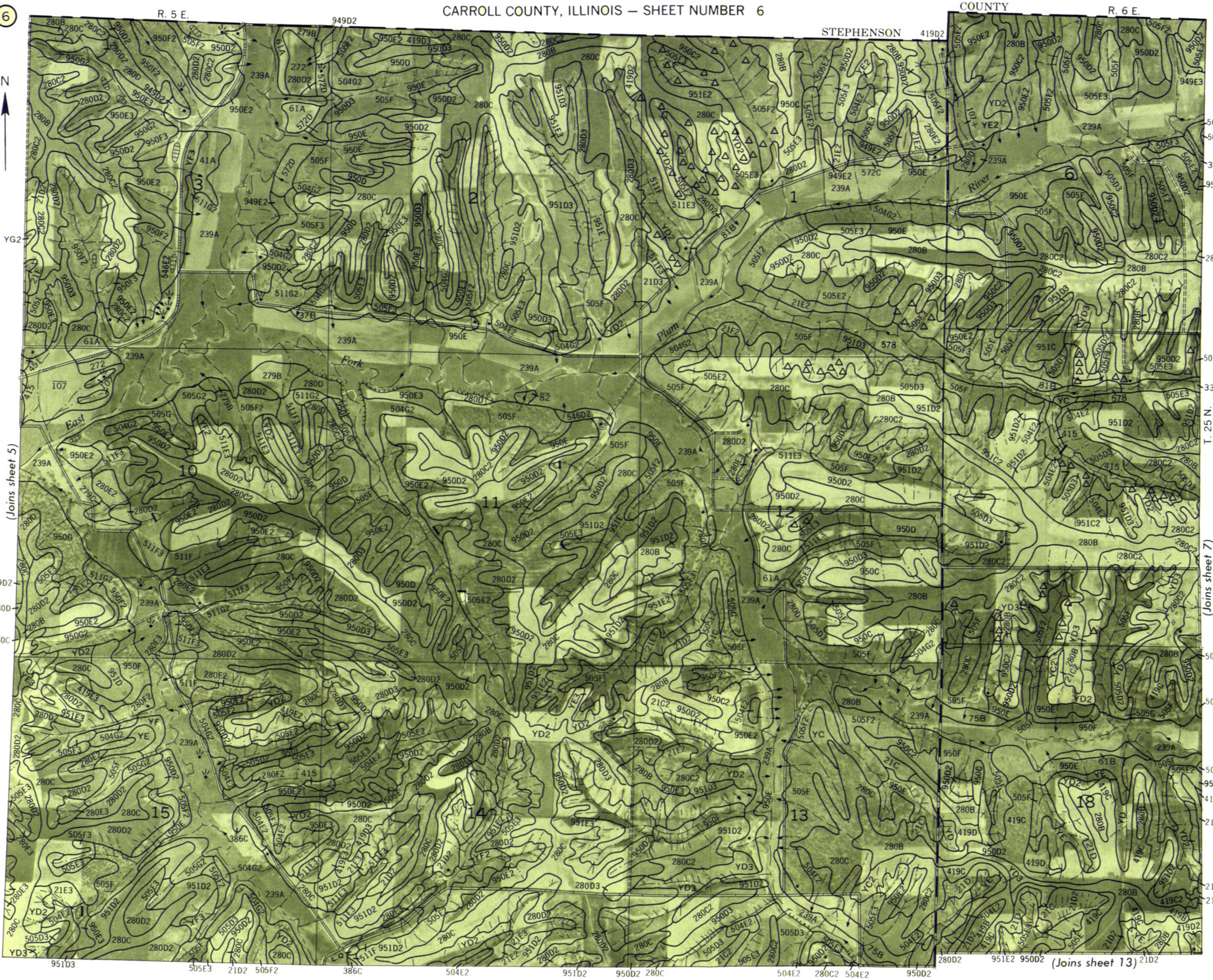
4




R. 4 E.
R. 5 E.
JO DAVIESS COUNTY
5
N
(Joins sheet 4)
(Joins sheet 6)
(Joins sheet 12)
T. 25 N.
Plum
River
Park
East
G.P.
0
½
1 Mile
Scale 1:20 000
0
5000 Feet

6

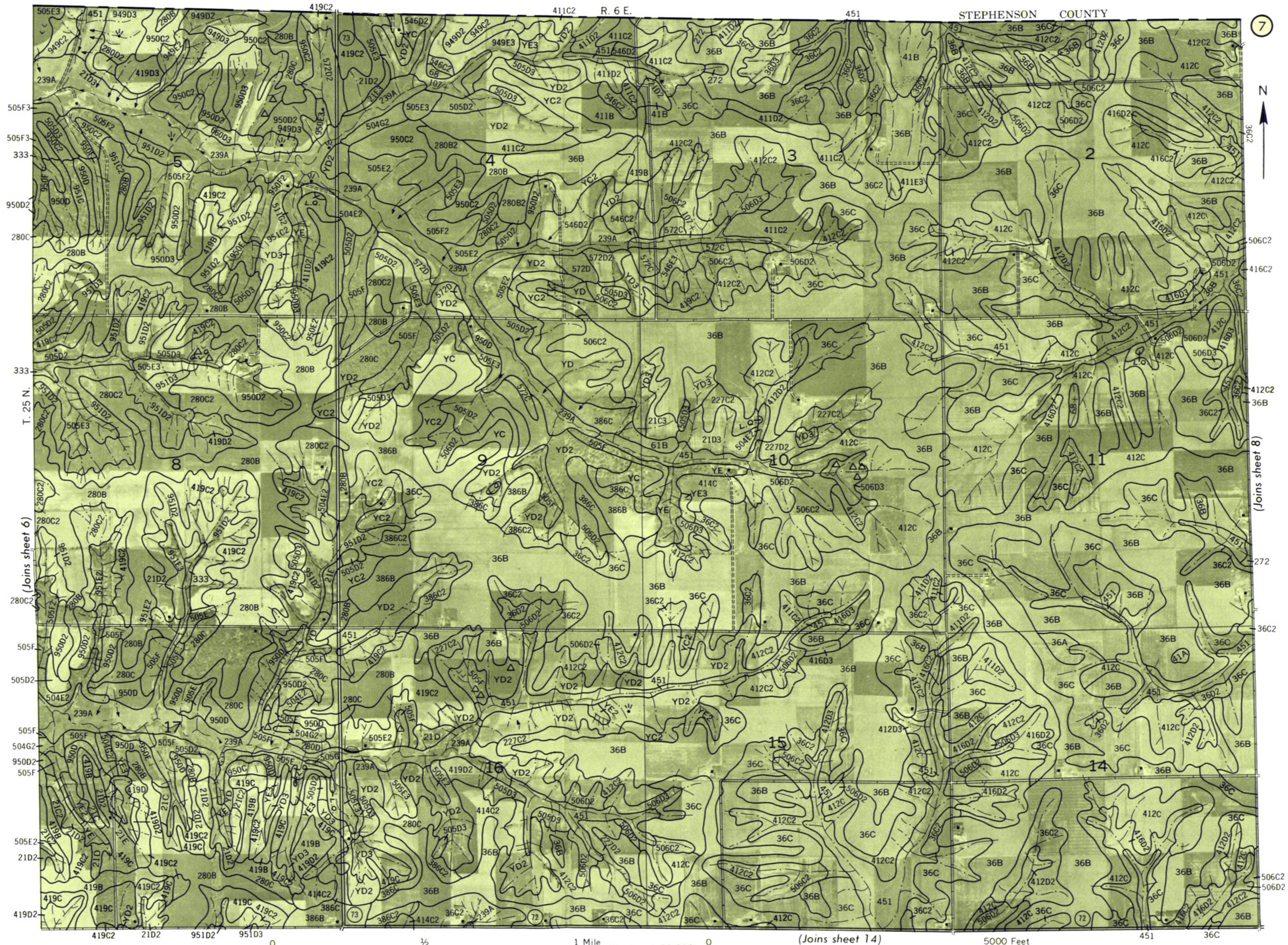
CARROLL COUNTY, ILLINOIS — SHEET NUMBER 6



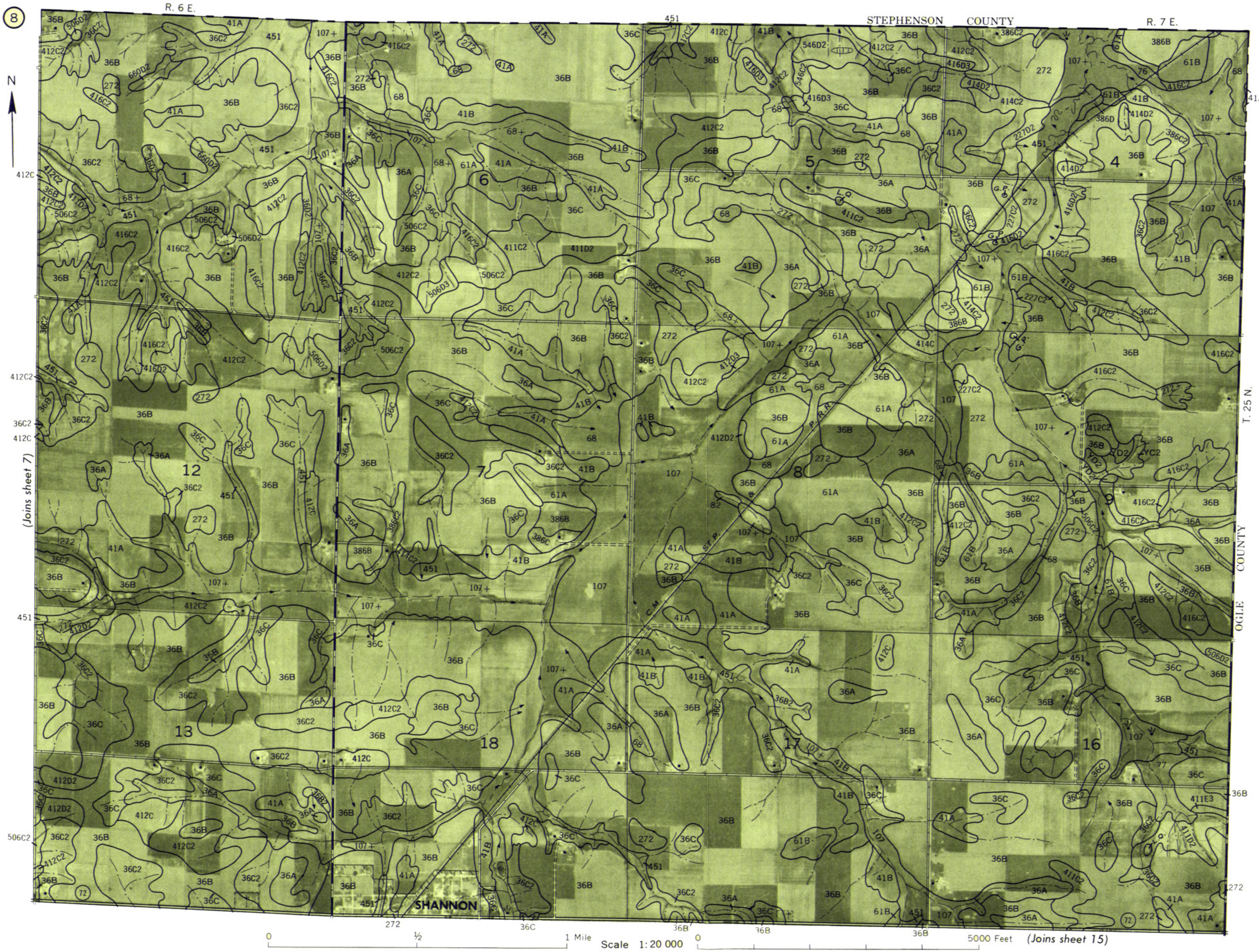
Scale 1:20 000

0 ½ 1 Mile

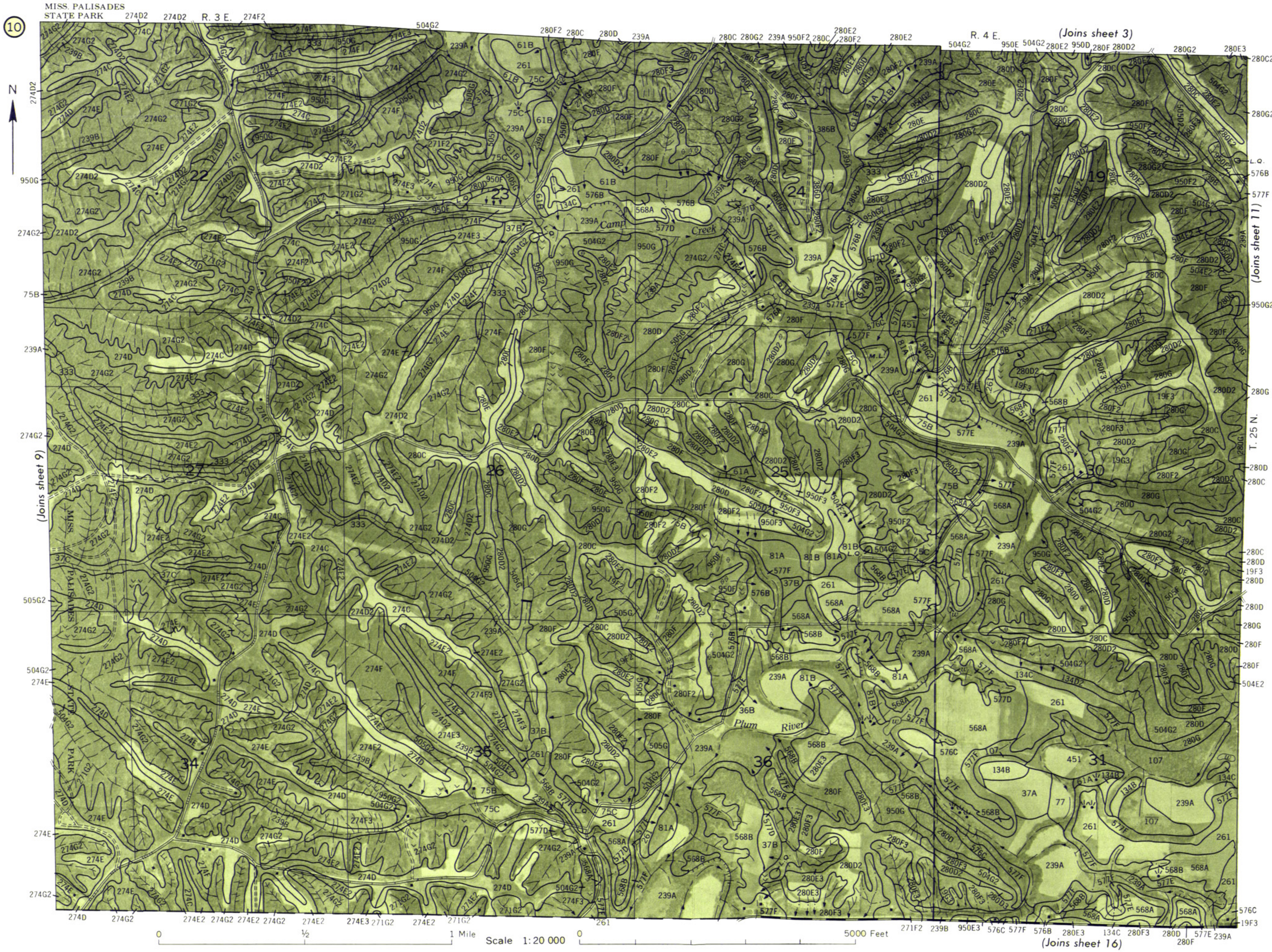
0 5000 Feet



0 ½ 1 Mile Scale 1:20 000 0 5000 Feet


8
R. 6 E.
R. 7 E.
STEPHENSON COUNTY
N
T. 25 N.
OGLE COUNTY
(Joins sheet 7)
SHANNON
Scale 1:20 000
0
½
1 Mile
0
5000 Feet
(Joins sheet 15)

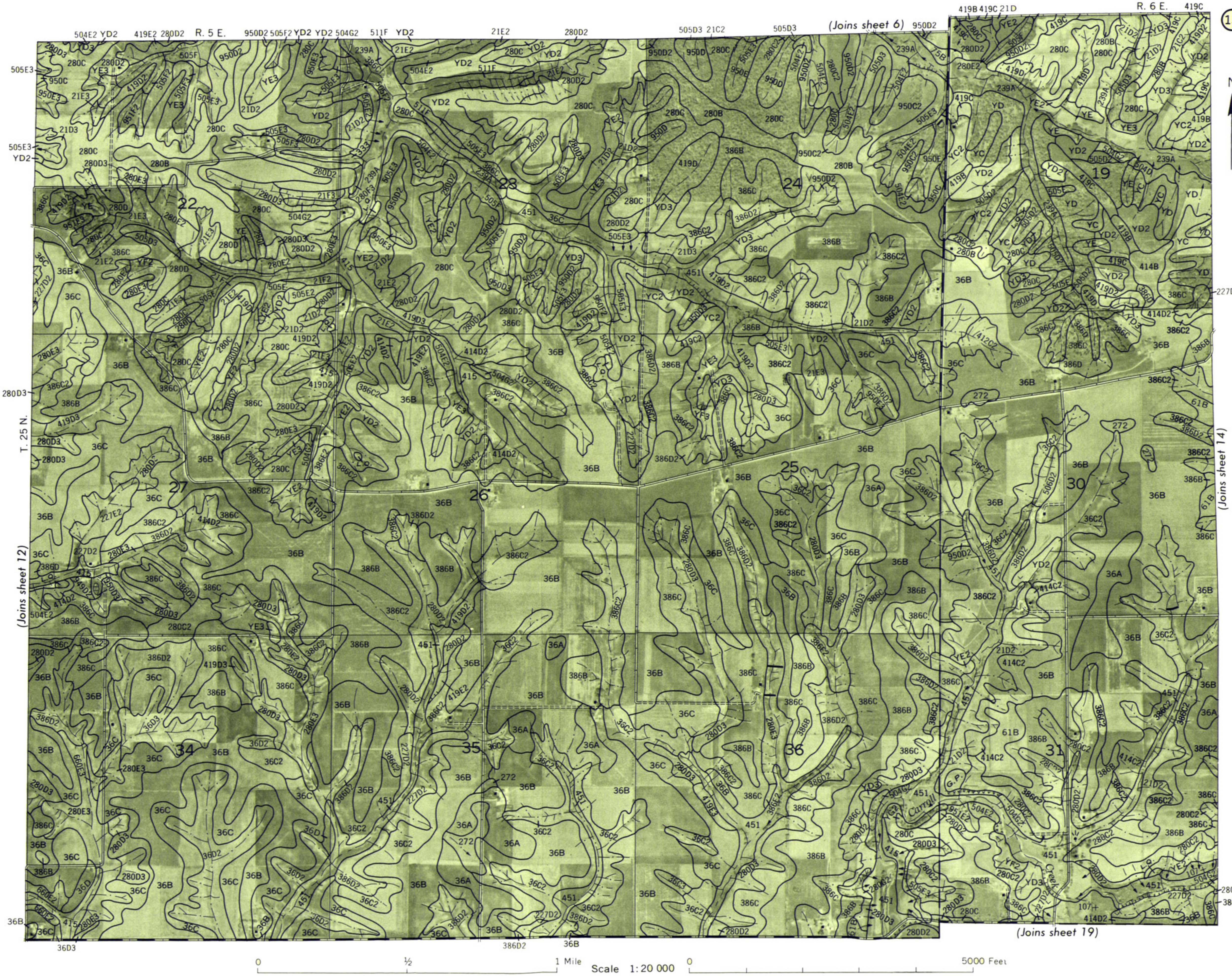

(Joins sheet 2)
R. 3 E.
9
N
T. 25 N.
(Joins sheet 10)
(Joins sheet 16)
MISSISSIPPI RIVER
MISS. RIVER
MISS. RIVER
STATE
OF
IOWA
MISSISSIPPI
PALISADES
STATE
PARK
C.B.&Q.R.R.
19
20
21
28
29
30
33
455
451
81A
239A
239B
333
37A
37C
76
274D
274D2
274E
274G2
271G2
504G2
505G2
75B
0
½
1 Mile
Scale 1:20 000
0
5000 Feet

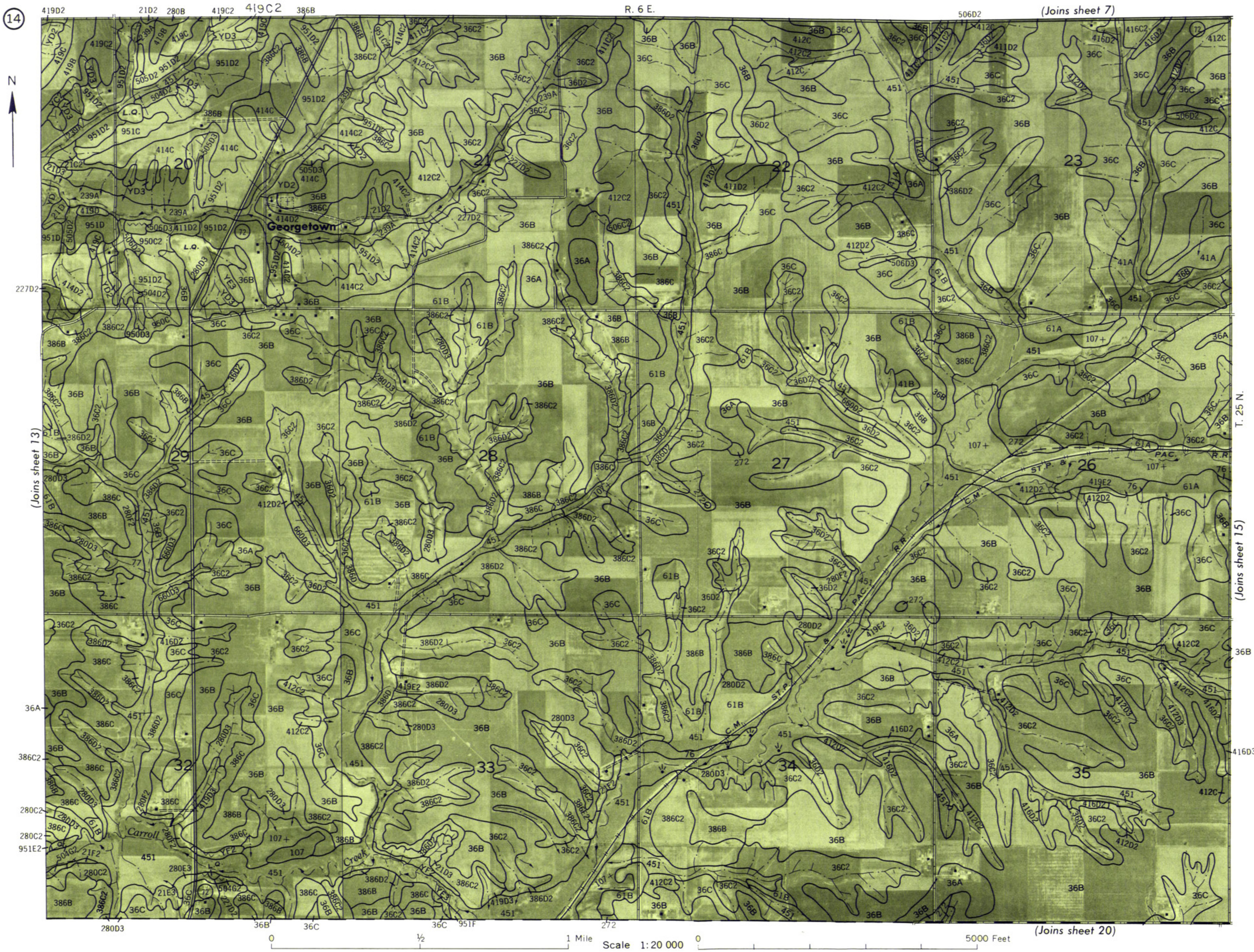

10
MISS. PALISADES STATE PARK
R. 3 E.
R. 4 E.
(Joins sheet 3)
(Joins sheet 11)
(Joins sheet 9)
(Joins sheet 16)
T. 25 N.
N
22
23
24
19
27
26
25
30
34
35
36
31
Camp Creek
Plum River
MISS. PALISADES STATE PARK
0
½
1 Mile
Scale 1:20 000
0
5000 Feet

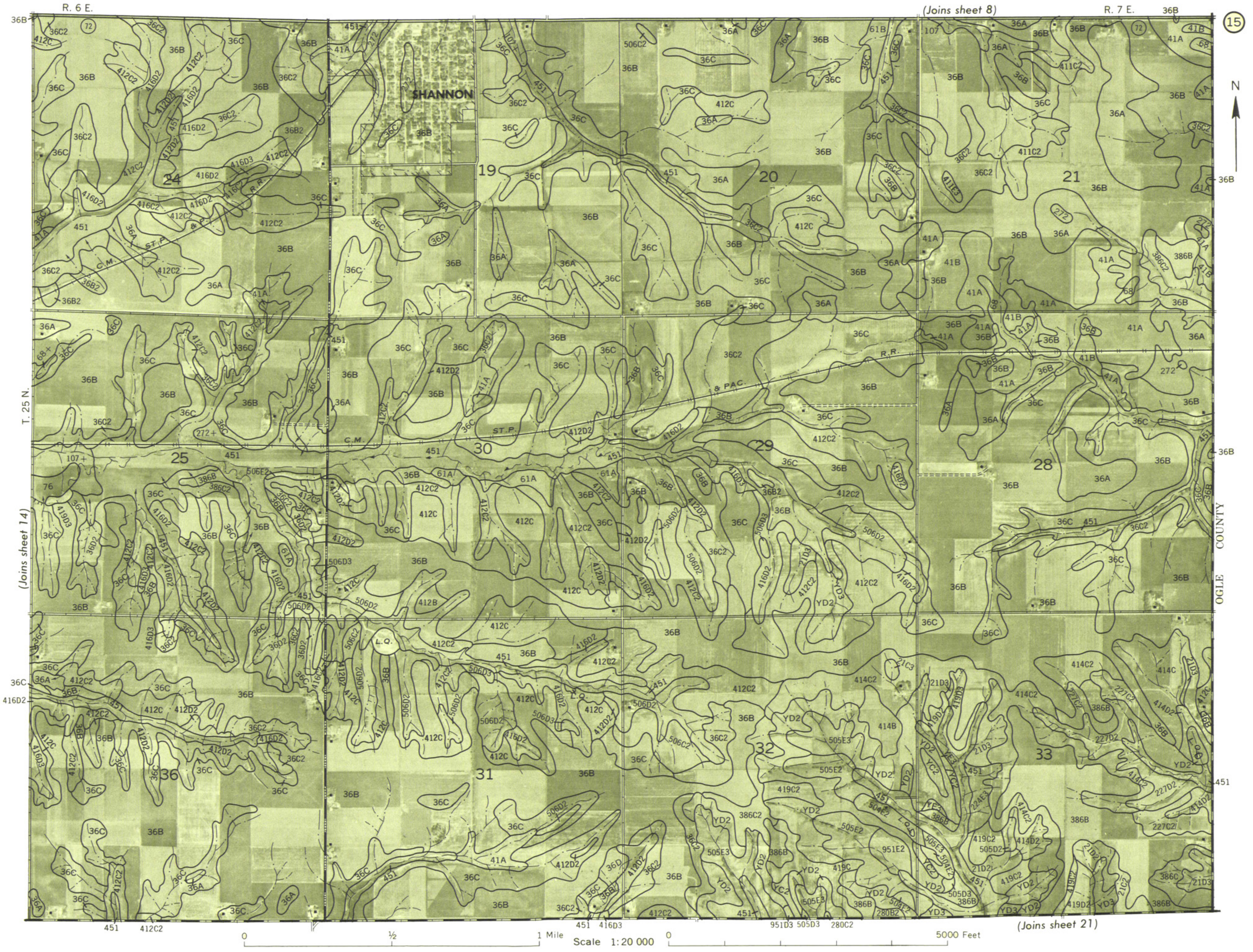
CARROLL COUNTY, ILLINOIS — SHEET NUMBER 11

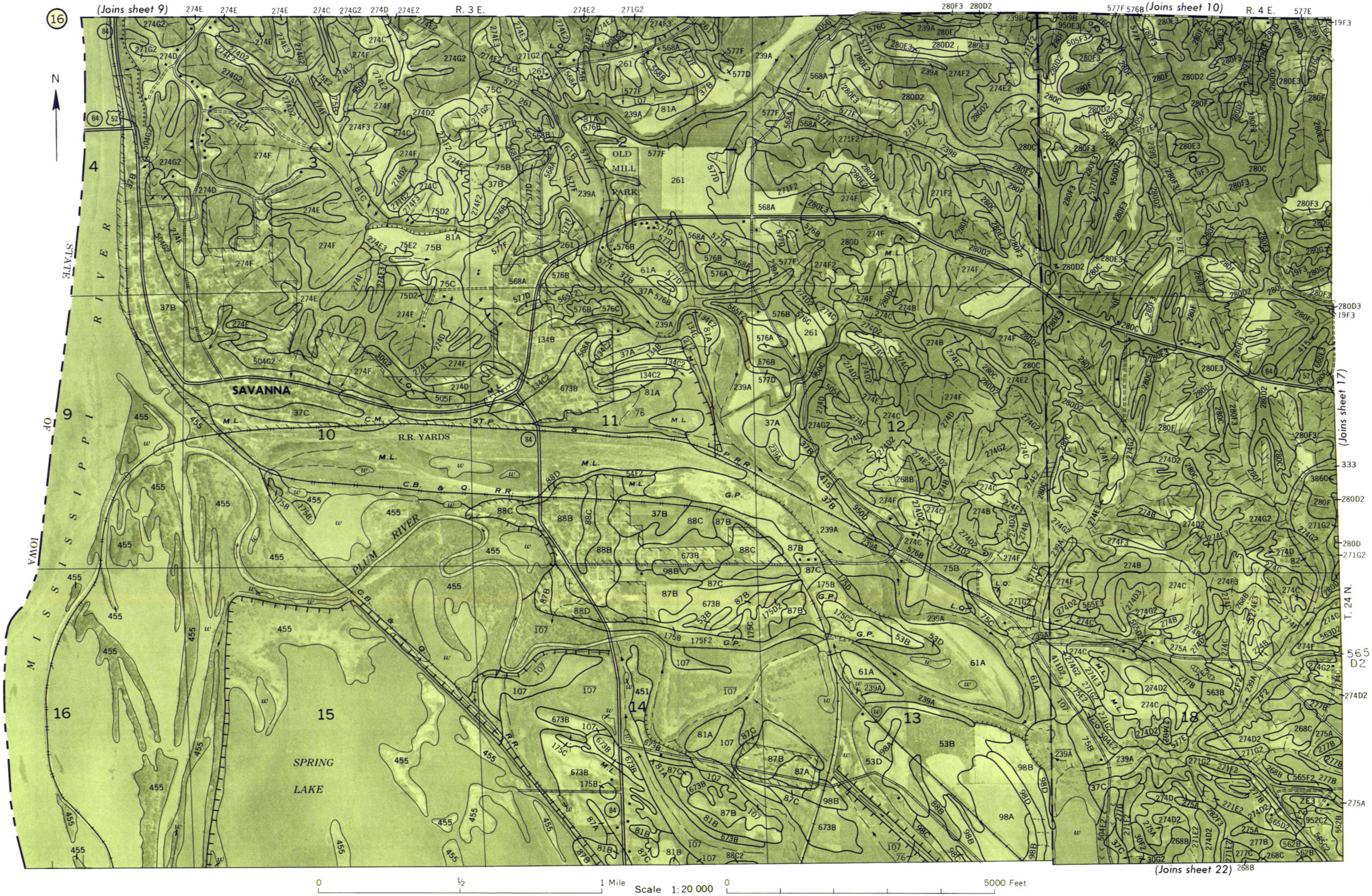
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

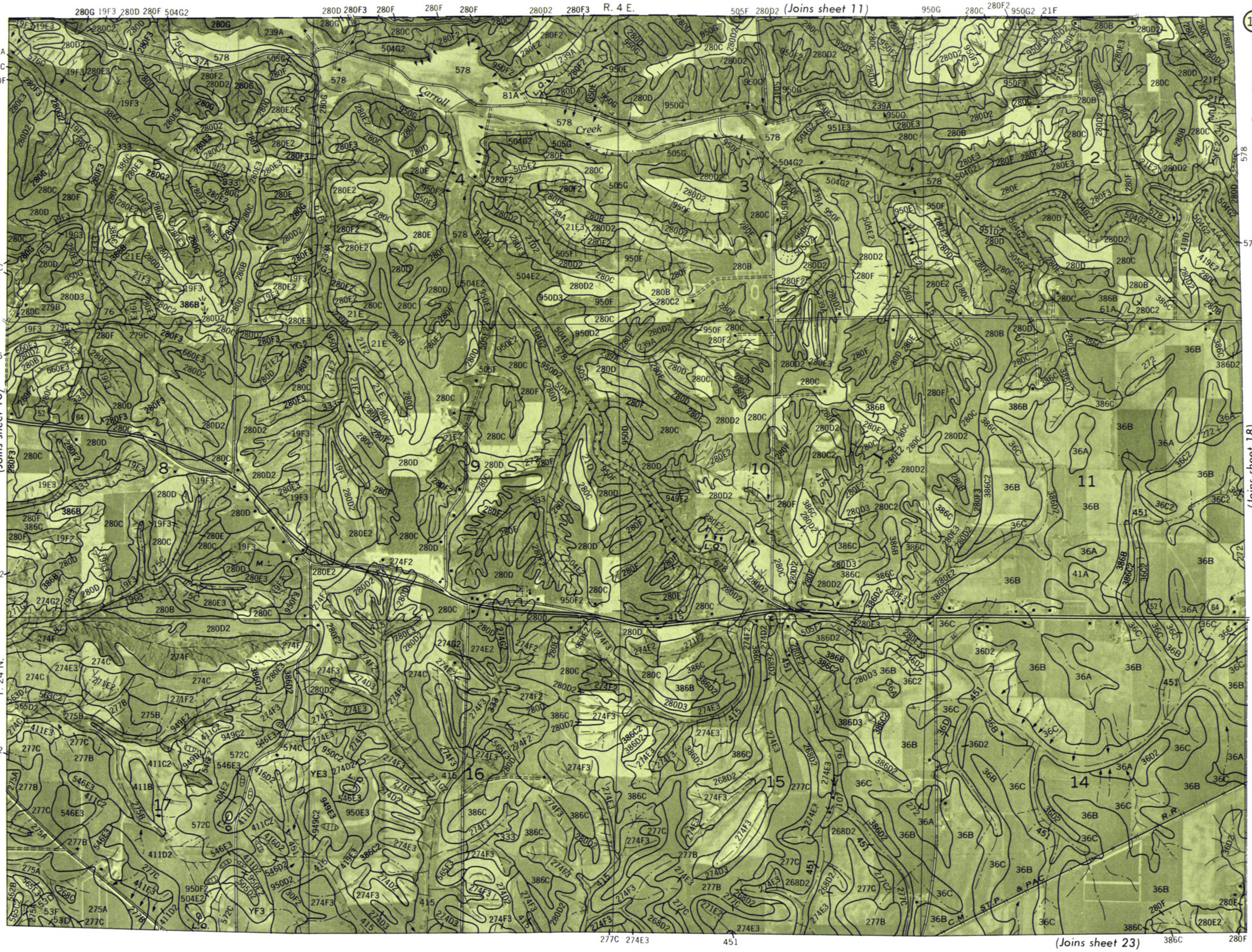

12
N
R. 4 E.
R. 5 E.
T. 25 N.
(Joins sheet 5)
(Joins sheet 11)
(Joins sheet 13)
(Joins sheet 18)
24
19
20
21
25
30
29
28
36
31
32
33
0
½
1 Mile
Scale 1:20 000
0
5000 Feet


13
R. 5 E.
R. 6 E.
T. 25 N.
N
(Joins sheet 6)
(Joins sheet 12)
(Joins sheet 14)
(Joins sheet 19)
19
22
23
24
25
26
27
30
31
34
35
36
0
½
1 Mile
Scale 1: 20 000
0
5000 Feet


14
N
R. 6 E.
(Joins sheet 7)
(Joins sheet 13)
(Joins sheet 15)
(Joins sheet 20)
T. 25 N.
Georgetown
Carroll
Creek
20
21
22
23
29
28
27
26
32
33
34
35
C. M. ST. P. & PAC. R.R.
0
½
1 Mile
Scale 1: 20 000
0
5000 Feet


R. 6 E.
(Joins sheet 8)
R. 7 E.
15
N
SHANNON
T. 25 N.
(Joins sheet 14)
OGLE COUNTY
(Joins sheet 21)
19
20
21
24
25
28
29
30
31
32
33
36
C. M. ST. P. & PAC. R.R.
0
½
1 Mile
Scale 1:20 000
0
5000 Feet


16
(Joins sheet 9)
R. 3 E.
(Joins sheet 10)
R. 4 E.
N
(Joins sheet 17)
T. 24 N.
(Joins sheet 22)
OLD
MILL
PARK
SAVANNA
R.R. YARDS
STATE OF IOWA
MISSISSIPPI RIVER
PLUM RIVER
SPRING LAKE
C.M. ST.P. & P. R.R.
C.B. & Q. R.R.
0 ½ 1 Mile
Scale 1:20 000
0 5000 Feet

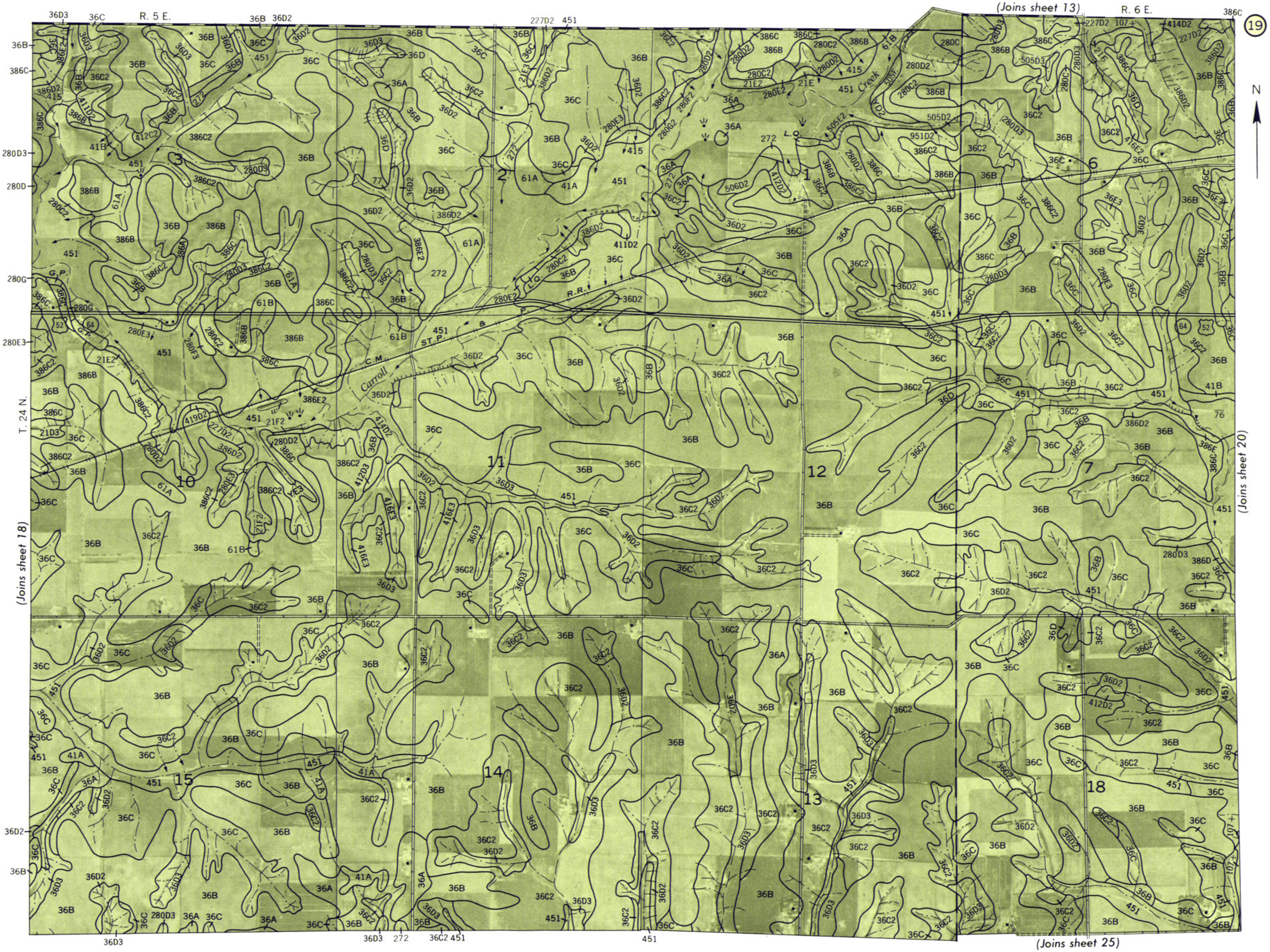


Scale 1:20 000

0 ½ 1 Mile

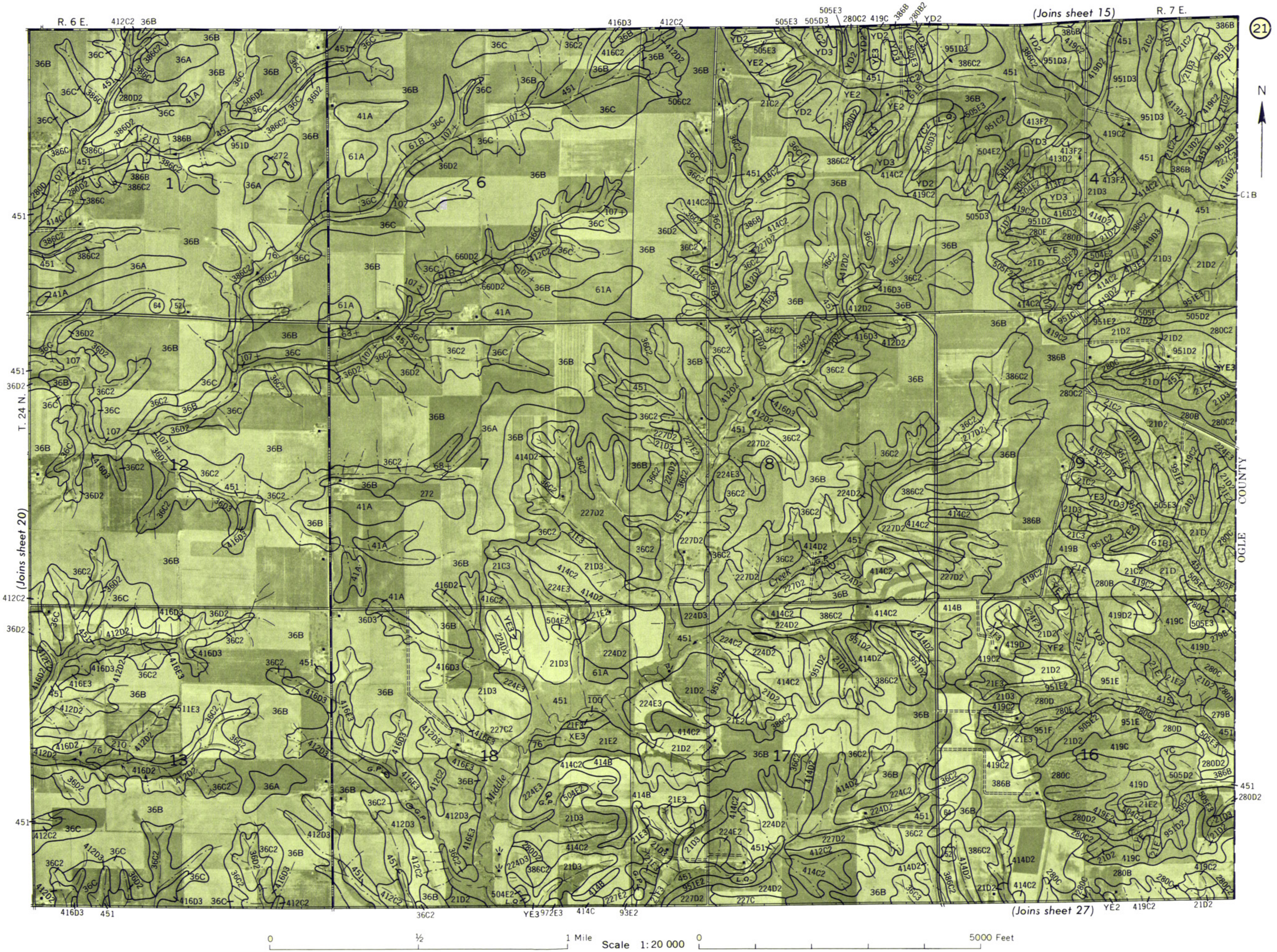
0 5000 Feet


18
R. 4 E.
R. 5 E.
(Joins sheet 12)
(Joins sheet 17)
(Joins sheet 19)
(Joins sheet 24)
T. 24 N.
N
MT. CARROLL
C. M. ST. P. & PAC. R. R.
Carroll Creek
Johnson Creek
Scale 1: 20 000
0
½
1 Mile
5000 Feet

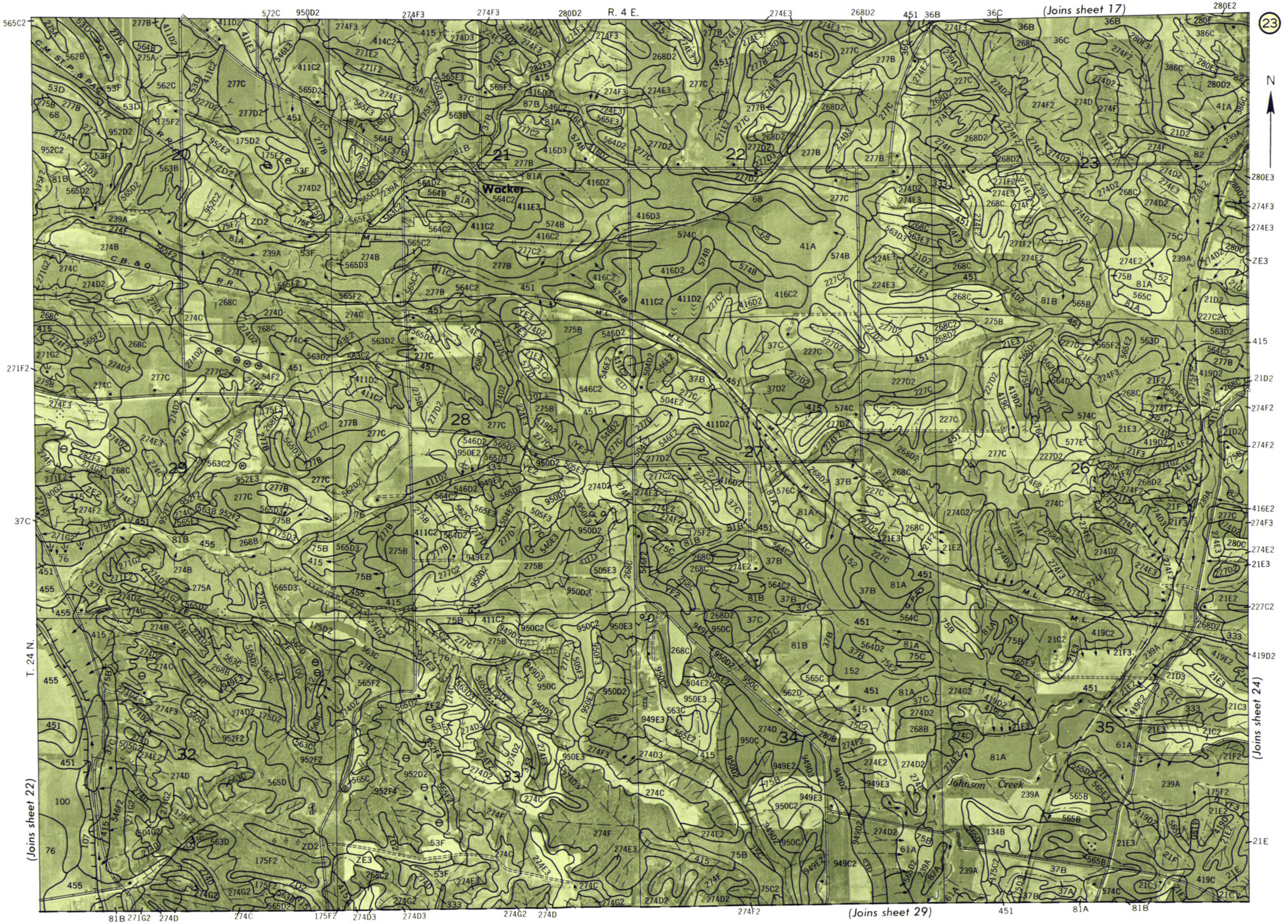


0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

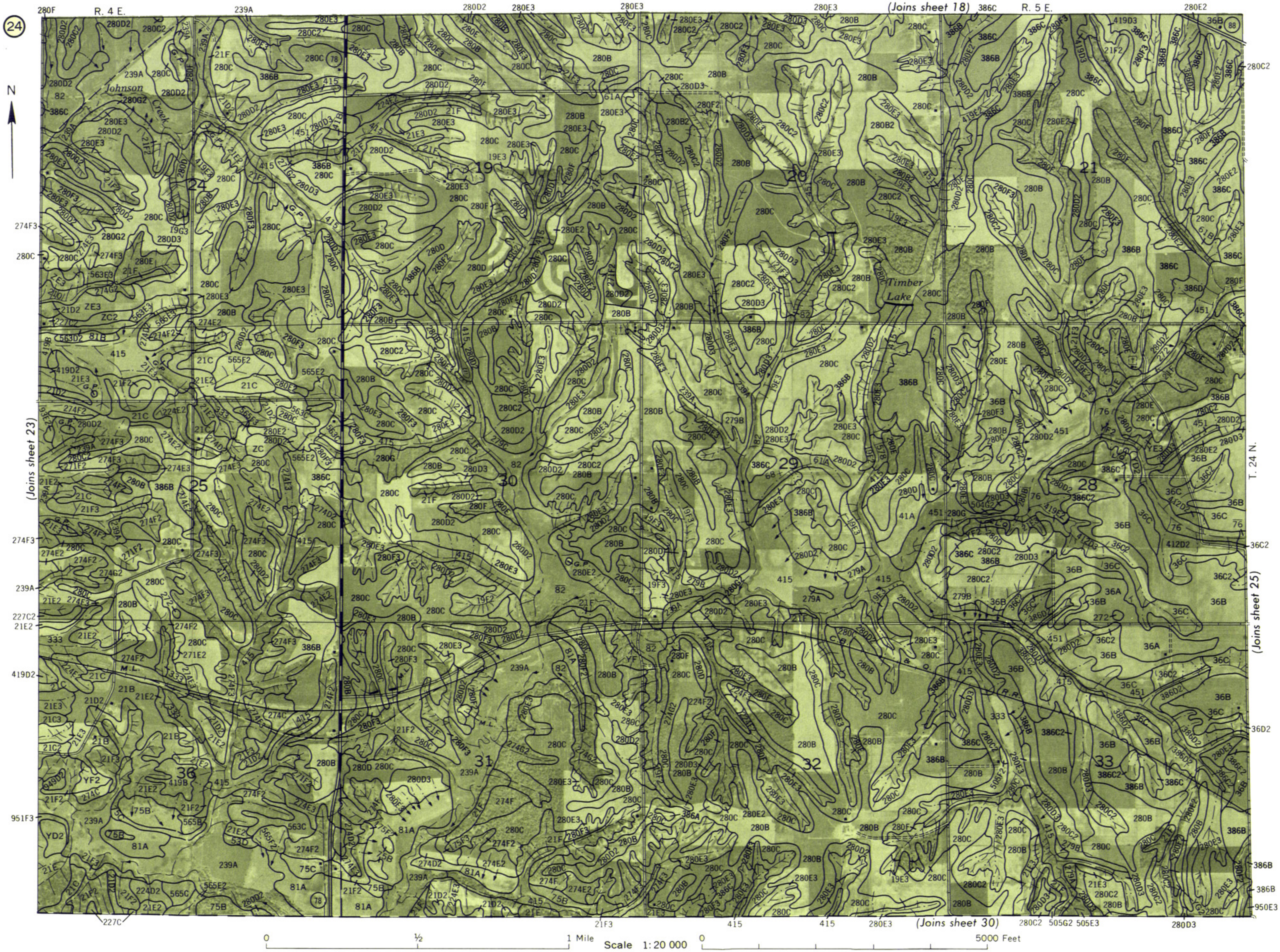
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

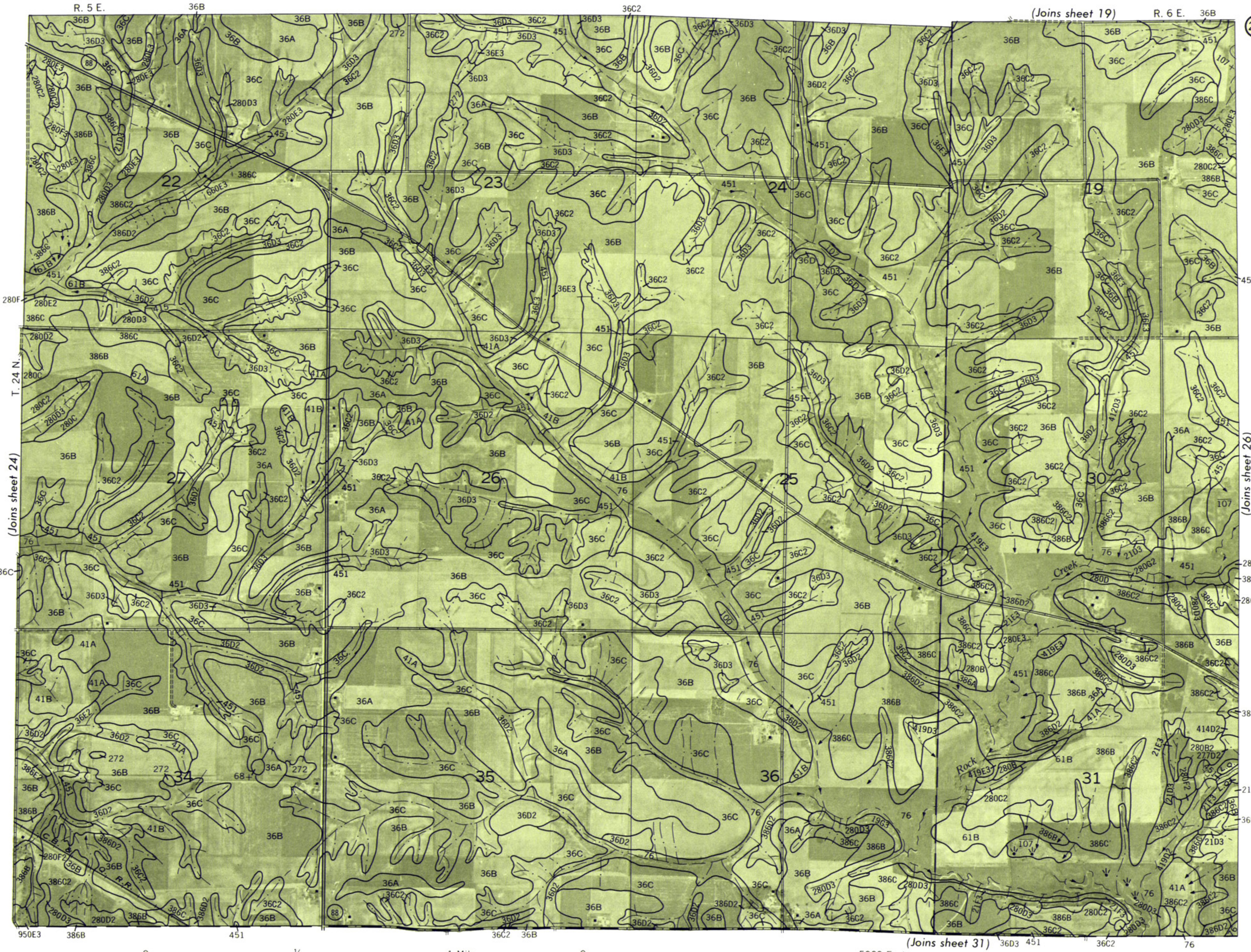

R. 6 E.
(Joins sheet 15)
R. 7 E.
21
N
T. 24 N.
(Joins sheet 20)
OGLE COUNTY
(Joins sheet 27)
Middle Creek
0
½
1 Mile
Scale 1:20 000
0
5000 Feet

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet



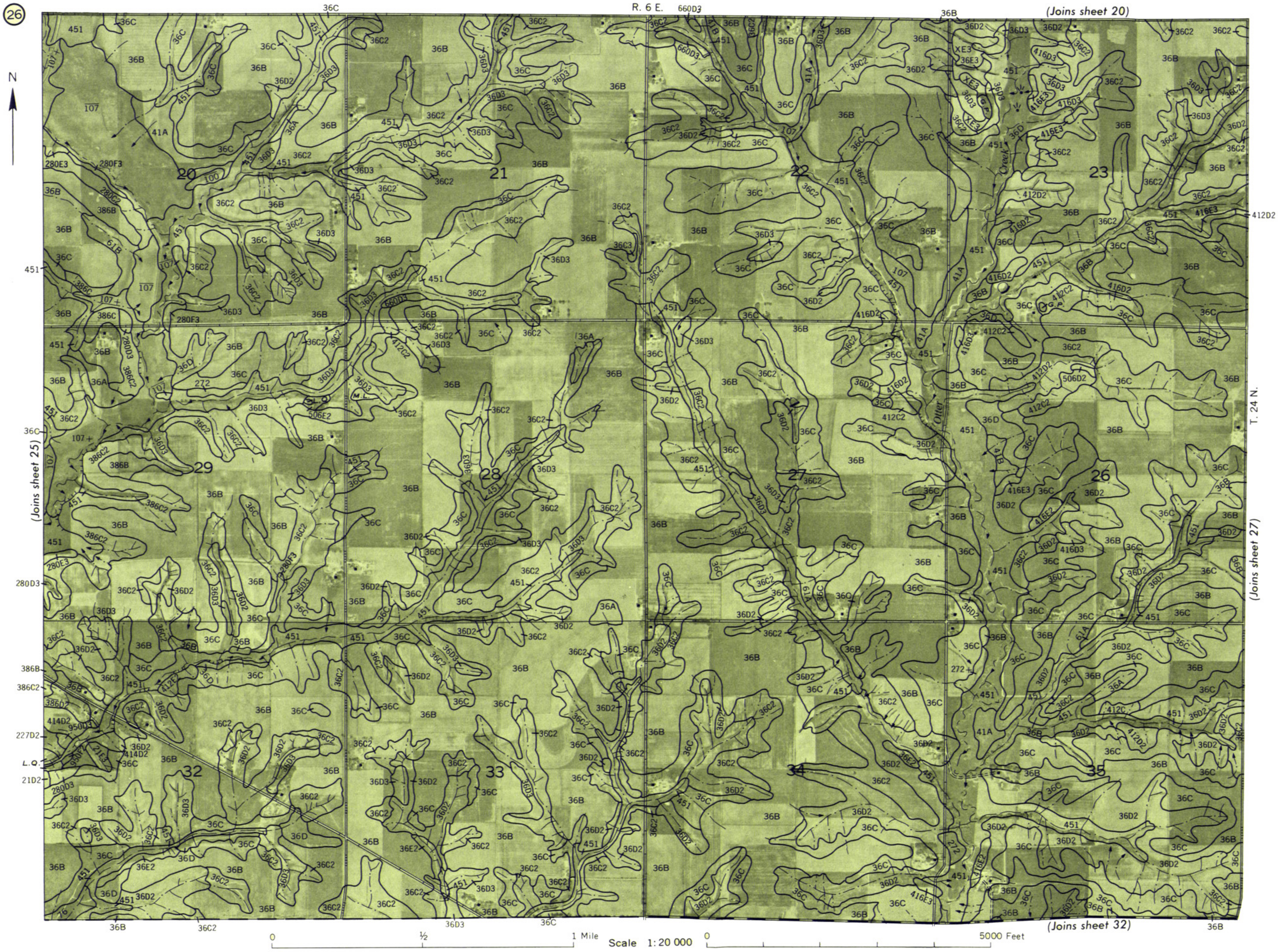
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

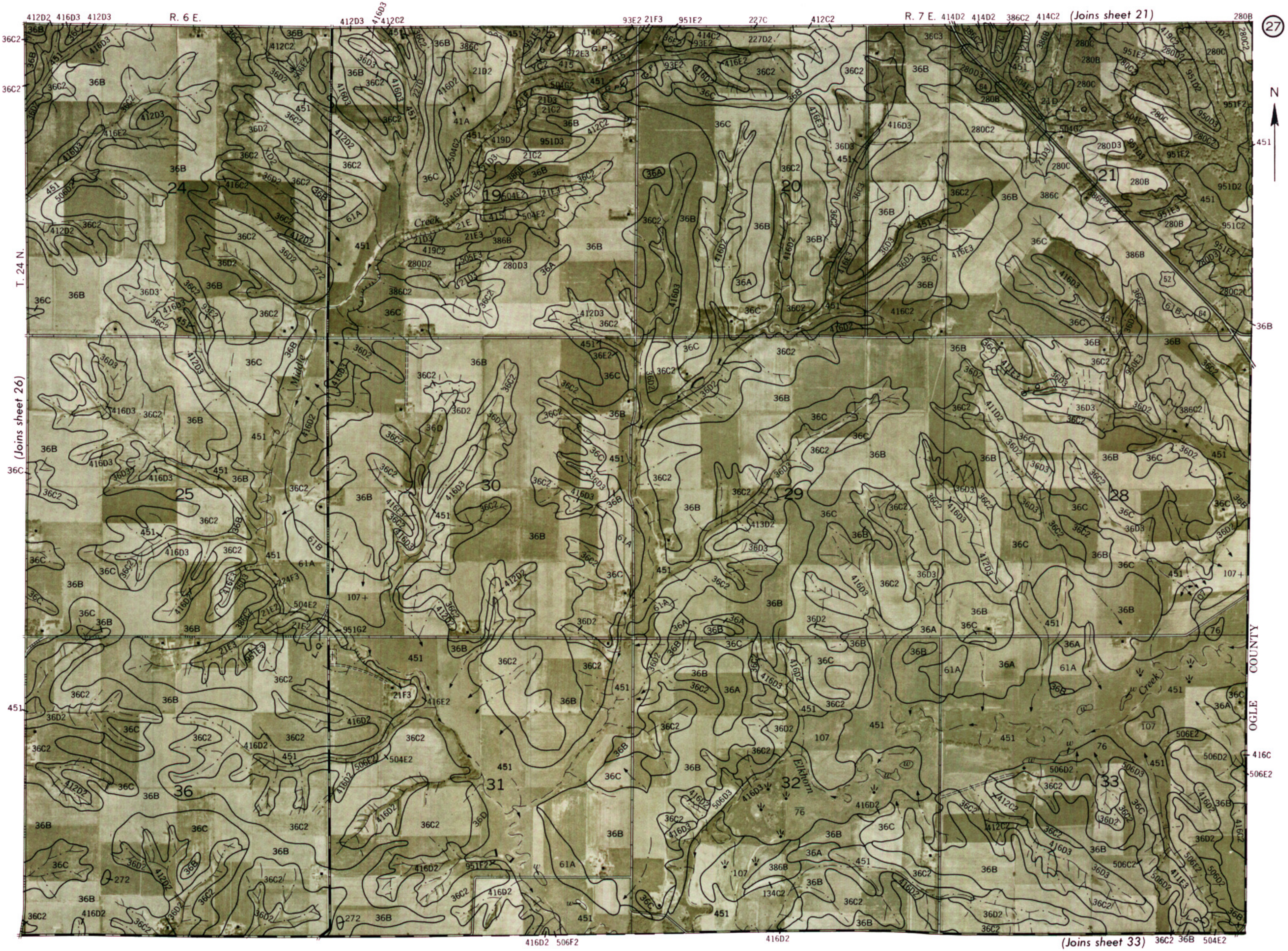

24
N
R. 4 E.
R. 5 E.
(Joins sheet 18)
(Joins sheet 23)
(Joins sheet 25)
(Joins sheet 30)
T. 24 N.
Johnson Creek
Timber Lake
19
20
21
24
25
28
29
30
31
32
33
36
0
½
1 Mile
Scale 1:20 000
0
5000 Feet



0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

26


N
R. 6 E.
T. 24 N.
(Joins sheet 20)
(Joins sheet 25)
(Joins sheet 27)
(Joins sheet 32)
Otter Creek
20
21
22
23
29
28
27
26
32
33
34
35
0
½
1 Mile
Scale 1:20 000
0
5000 Feet



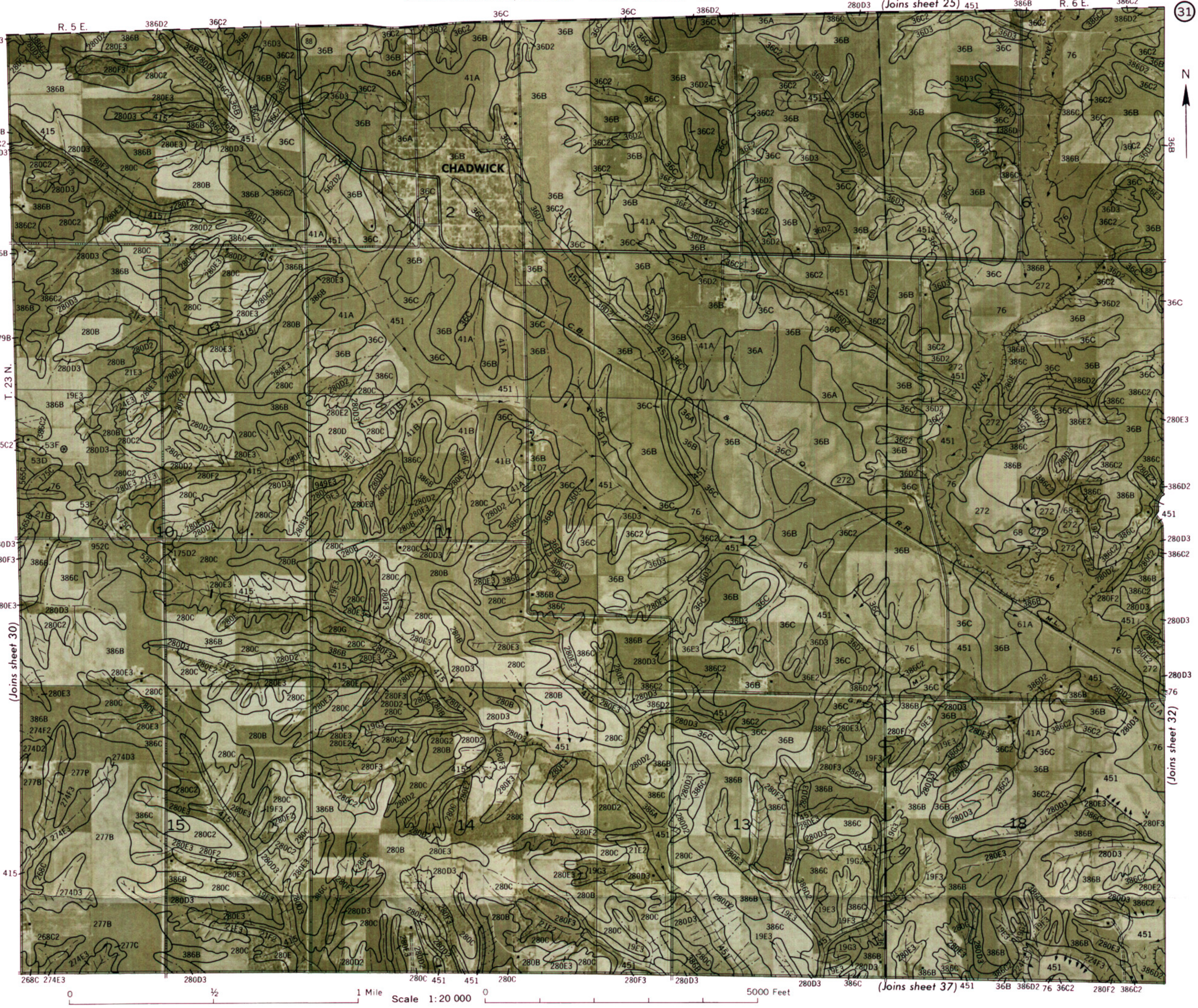
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

CARROLL COUNTY, ILLINOIS — SHEET NUMBER 30

Scale 1:20 000

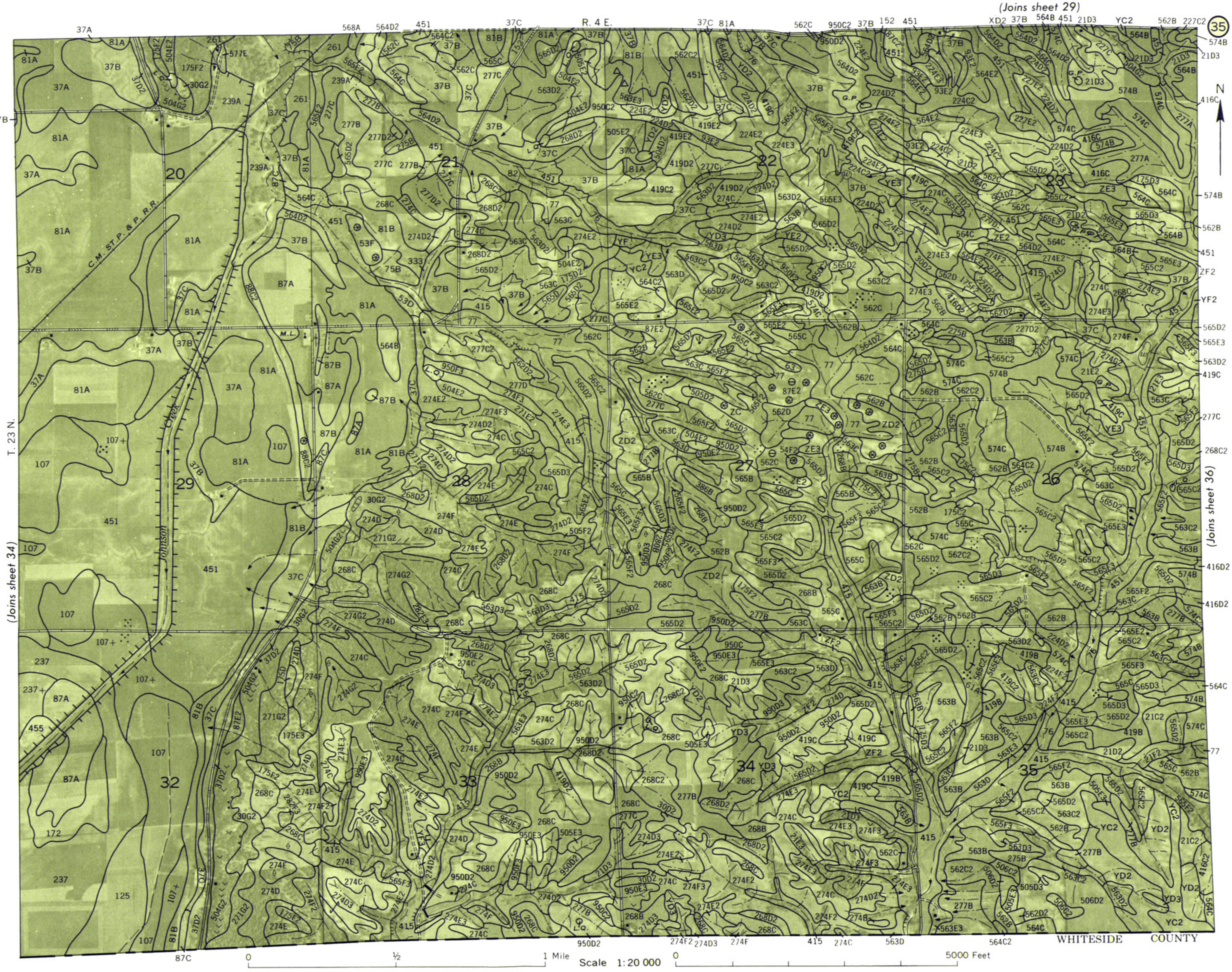

31
R. 5 E.
R. 6 E.
T. 23 N.
N
CHADWICK
(Joins sheet 25)
(Joins sheet 30)
(Joins sheet 32)
(Joins sheet 37)
C. B. & Q. R. R.
Rock Creek
0 ½ 1 Mile
Scale 1:20 000
0 5000 Feet

CARROLL COUNTY, ILLINOIS — SHEET NUMBER 32

CARROLL COUNTY, ILLINOIS — SHEET NUMBER 33

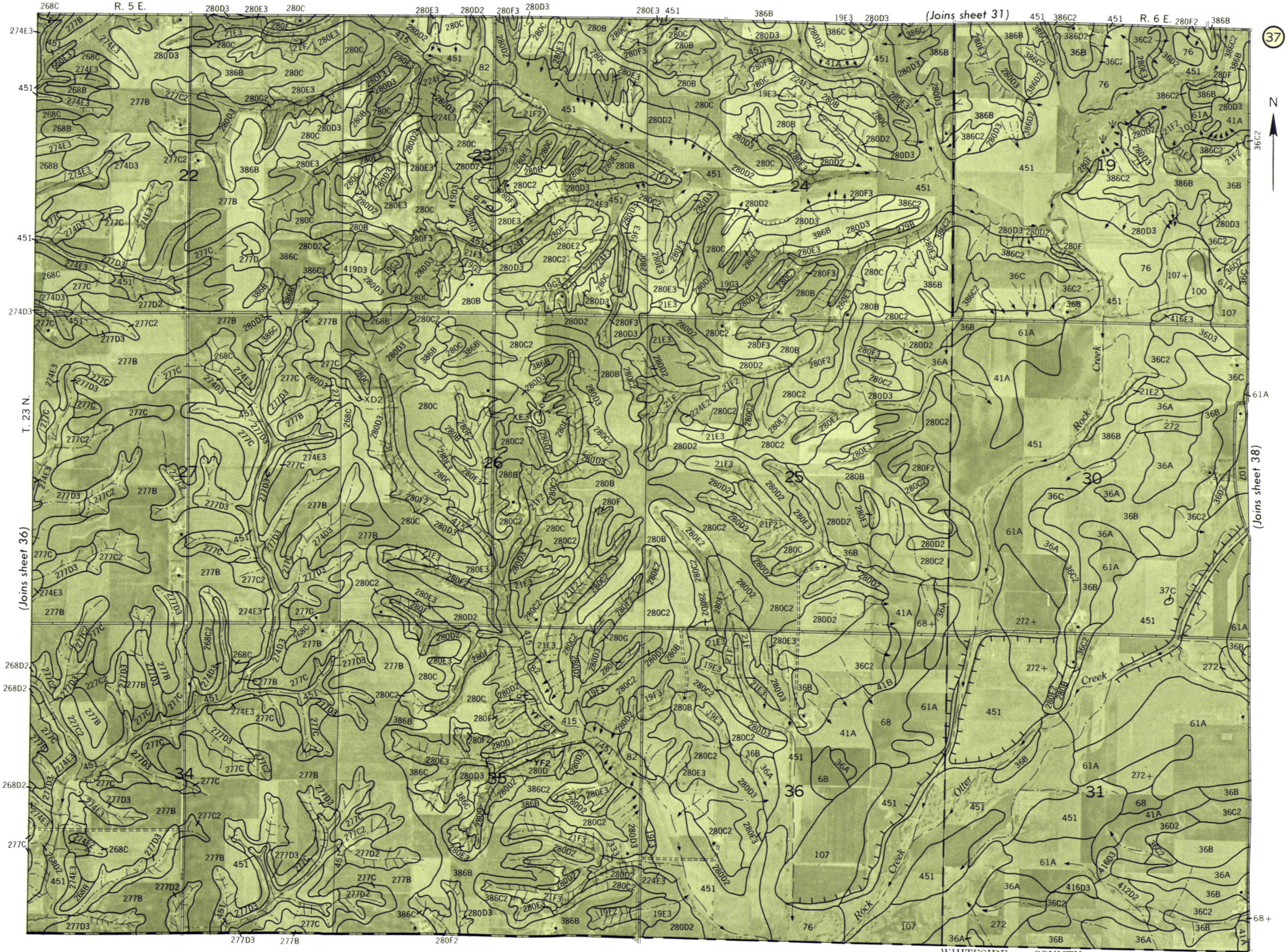
0 ½ 1 Mile Scale 1:20 000 0 5000 Feet

Scale 1: 20 000
0 ½ 1 Mile
0 5000 Feet

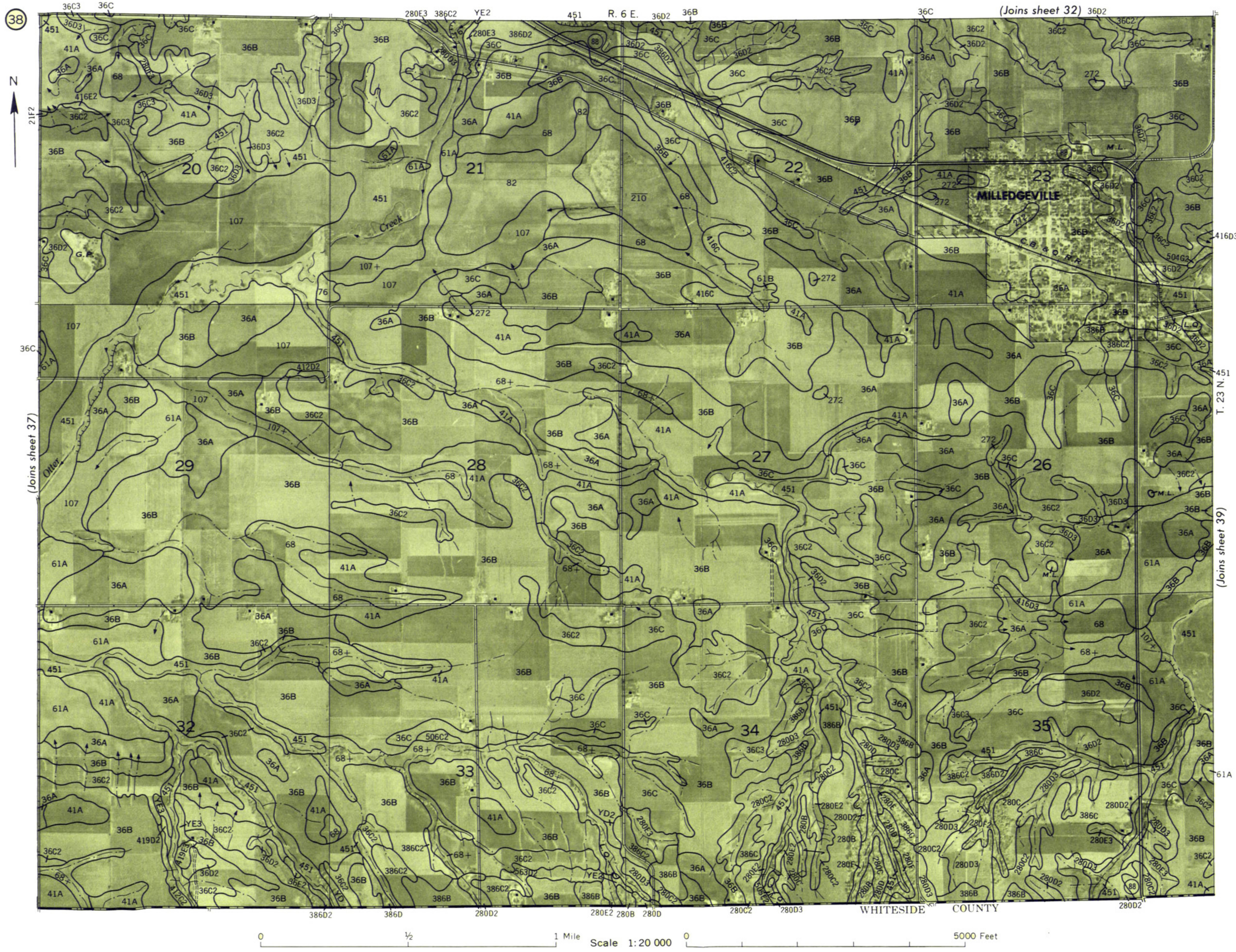

(Joins sheet 29)
35
R. 4 E.
T. 23 N.
(Joins sheet 34)
(Joins sheet 36)
C. M. ST. P. & P. R.R.
Johnson Creek
20
21
22
23
26
27
28
29
32
33
34
35
WHITESIDE COUNTY
0
½
1 Mile
Scale 1:20 000
0
5000 Feet

CARROLL COUNTY, ILLINOIS — SHEET NUMBER 36

37



0 ½ 1 Mile Scale 1:20 000 0 5000 Feet


38
N
(Joins sheet 32)
R. 6 E.
(Joins sheet 37)
(Joins sheet 39)
T. 23 N.
MILLEDGEVILLE
C. B. & Q. R. R.
Otter
Creek
G. P.
M. L.
20
21
22
23
26
27
28
29
32
33
34
35
WHITESIDE COUNTY
0
½
1 Mile
Scale 1:20 000
0
5000 Feet


(Joins sheet 33)
R. 6 E.
R. 7 E.
39
N
Hazel-
hurst
T. 23 N.
(Joins sheet 38)
OGLE COUNTY
WHITESIDE COUNTY
Elkhorn Creek
C.B.& Q.R.R.
19
20
21
24
25
28
29
30
31
32
33
36
0
½
1 Mile
Scale 1:20 000
5000 Feet